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## Pig Iron Production Declines But Pig Iron Buyers Show More Interest

### Improving Outlook for Last Half of the Year

Very complete reports from blast furnace operators to *The Iron Age* show an output in June of 1,787,566 gross tons of coke and anthracite pig iron in the United States, against 1,893,456 tons in May. The falling off was but 105,890 tons, although the month was a day shorter. The daily output in June was 59,585 tons, which is 1494 tons under the daily rate in May. This is the lowest production of any month since January, when the daily output was 56,752 tons. The furnaces in blast July 1 numbered 197, against 203 in blast June 1, and their estimated daily capacity was 59,979 tons, against 61,844 tons June 1. The decline in the June output was confined to the merchant furnaces. Those connected with steel plants maintained a daily rate of 42,708 tons against 42,270 tons in May. These figures substantiate the reports of an improvement in the steel trade in June, and it is expected that the July figures will show this tendency more strongly. The June figures added to those for previous months make an aggregate of 11,470,054 tons of coke and anthracite pig iron produced in the first half of the year. Adding an estimate of 160,000 tons for the charcoal pig iron made, the total for the half year is 11,630,054 tons, against 12,319,807 tons produced in the last half of 1910, according to the authentic statistics of the American Iron and Steel Association. The decline was thus a little over 5 per cent.

The indications for the coming half year are much more cheerful than were those of last January. While the production of pig iron has been declining, the volume of business in finished products as well as in pig iron has been increasing. The United States Steel Corporation worked up to 73 per cent. of its total steel ingot capacity last week, which represents about what is expected to be realized after the passage of the dullness of the first half of July due to stoppages for repairs and inventories. The past week witnessed the closing of another large contract for steel bars by a Western agricultural implement manufacturer. Several smaller contracts of the same character were placed in Ohio. The steel bar market seems firmly anchored on the 1.25c. Pittsburgh basis. The closing of the New York Subway agreement with the Brooklyn Rapid Transit Company means the early placing of contracts which will eventually require over 200,000 tons of steel. While deliveries will be spread over several years, the amount required each year will be of much importance to the steel trade. The city of Detroit will open bids July 11 on 11,000 tons of cast iron pipe.

The railroad consumption of iron and steel is likely to be much heavier in the coming quarter. Specifications for rails are coming in more freely, while good orders are being placed for locomotives and cars, with a much more active demand indicated for the latter in the near future. All interests connected with furnish-

ing railroad equipment or supplies are now talking more hopefully and confidently.

Reports from the various pig iron markets are becoming much brighter. In the Chicago market melters are inquiring generally for last half delivery with the demand for malleable iron prominent. In Cincinnati inquiries for pig iron are remarkably good. Cleveland reports that the demand for pig iron there shows more life than for months, and an inquiry is out for 6000 tons of basic. Pittsburgh reports that inquiries for basic iron there total 30,000 tons, while an inquiry is also in the market for 3000 tons of Bessemer. Basic pig iron is now firmer as the stocks held by scrap dealers have been sold and those middlemen are therefore out of the market. It is now quoted at \$13.25 at Valley furnace, with some makers refusing to shade \$13.50. Interest among consumers is reported to be broadening at Buffalo with a considerable increase in the number of inquiries. The Eastern markets also show a somewhat larger demand.

In connection with pig iron matters the fact must be noted that the independent blast furnaces of the Middle West increased their stocks of pig iron last month by 33,000 tons. This was due to a considerable extent to the increasing make of furnaces connected with some steel plants.

The improved condition of the iron trade is making itself felt in coke, for which the demand is much more active both from blast furnaces and foundries, and prices are therefore a little firmer.

Lake Superior iron ore shipments in June were 4,826,525 tons. Shipments up to July 1 were 8,810,354 tons. This is a falling off of slightly over 6,000,000 tons, as compared with the movement to July 1 last year.

### The Wage Scale Settlements

Worthy of more than passing mention is the amicable settlement of certain mill wage scales for the twelve months beginning July 1. Sheet and tin plate scales were agreed to June 22 and the Republic bar iron scale June 28. The scales for the sheet and tin plate mills only apply to the works of such companies as recognize the Amalgamated Association, while the bar iron scale signed by the Republic Iron & Steel Company only relates to its mills working on iron. Quite a number of bar iron makers organized as the Western Bar Iron Association will be represented in conference with the Amalgamated Association at a meeting arranged for July 6, but it appears settled that those manufacturers will follow the example of the Republic Iron & Steel Company.

While these wage settlements affect a very small part of the capacity of the country's iron and steel finishing mills, they constitute that part of the trade in which wage scales are agreed upon at this time of the year. The fact that a harmonious adjustment has been reached is gratifying, as labor troubles are always unpleasant and involve both loss and inconvenience, but the further fact that the terms agreed upon continue the rates paid for the past year is highly interesting. It had been expected that the depression in trade and the decline in prices would so warrant a demand by manufacturers for a reduction in the rate of wages for the coming year that such a claim would not only be presented, but be emphatically insisted upon. Unquestionably the reduced prices for sheets and bar iron have seriously cut into the profits of manufacturers. In the case of tin plates prices have not been reduced, it is true, but if the depression in business should continue far into the last half of the year it

might be necessary to make a cut in that branch also. The continuance of old rates of wages, however, appears to represent a belief among manufacturers that the slight turn for the better which has recently been apparent presages a more favorable state of trade in the near future.

Another fact stands out very clearly. Wage scales are no longer attacked when a depression in trade makes its appearance as was the case not so many years ago. In those days the pay roll was one of the first points to be considered when the necessity for retrenchment or a reduction in costs made itself felt. It might provoke difficulty and precipitate labor troubles, but chances were taken of such a result, as, if a reduction was effected, it was an easier and simpler way to cut down the cost of production than to study where economies could be secured in other directions. Managers have become more enlightened, more efficient and perhaps more sympathetic than was formerly the case, notwithstanding the impression that the corporate form of doing business leads to the elimination of personality.

Whatever may be the influences or considerations which have brought about this settlement of the wage scales for 1911-1912, the result attained must be a serious disappointment to those who have so persistently claimed that the liquidation imposed by the panic of 1907 must run its course until it included labor. If these wage scales had been cut down, that would have been claimed as an indication that the liquidation in labor was progressing. The movement downward, however, has evidently not acquired a sufficient impetus to carry every element of cost with it.

### Railroad Earnings Fairly Good

The Bureau of Railway Economics, Washington, which is maintained by the railroads and makes a monthly presentation from statistics of railroad earnings identical with those which the Interstate Commerce Commission summarizes somewhat more slowly, has just issued its April chart, reducing railroad earnings to a per mile basis, which, of course, is the only fair method of comparison, because railroad mileage increases each year. The showing for the first four months of this year is not, on the whole, unsatisfactory. It is true that revenues, after January, have been slightly lower than a year earlier, but expenses have decreased almost as much, so that the decrease in net revenue, particularly for April, is not proportionately as great as the decrease in gross. The bureau's comparison is made only with the months of the preceding year. If we go back to earlier years we shall find the comparison quite favorable, for the first four months of this year, if they do not make an altogether pleasant showing with the same months of 1910, do make a distinctly favorable showing as compared with either 1909 or 1908. It is not possible to go back farther than July 1, 1907, when the uniform accounting system of the Interstate Commerce Commission went into effect.

We find that the gross revenue per mile of line in the first four months of this year averaged well above \$900 per month, with the exception of February, a short month. This, as observed, was slightly below 1910, but above 1909 and far above 1908, when the average was not much above \$750. Net revenue this year ranged from about \$225 in January and February to between \$275 and \$300 in March and April, somewhat less than in 1910, practically identical with 1909 and much above 1908, which showed about \$175 in



January and February and about \$235 in March and April.

The argument of the railroads that they must have large surplus earnings in order that extensions may be made is not being taken altogether as much to heart by the public at large as formerly. The trend in current thought is rather directly toward economizing, and there is room for questioning the ultimate advantage of finding earnings in one place to invest in another place which cannot support itself. Of course a new line cannot be expected to be made to pay from the start, but it ought to be able to become a paying proposition at an early date; otherwise it is not in accordance with present day ideas of economy to build it.

Improvements upon existing lines have never been seriously in jeopardy. They are called for by increase in the traffic, and that increase in traffic is sure to produce the funds, irrespective of the curious doctrine offered last year in the advanced rate cases, that as traffic increased the cost per unit for conducting it increased. That the total freight traffic of the country is bound to increase apace, with few and slight backsets, is indubitable, and it is not conceivable that this should not, year by year, place the railroads in better and better position.

For handling the growing traffic, the railroads will from time to time require more cars and locomotives, and will wear out their rails faster. Those are the orders, rather than occasional large expenditures for extensions of lines, which in the long run will be most profitable to the iron and steel industry.

### The Use of Portland Cement

Statistics of the production of Portland cement in 1910, just made public by the United States Geological Survey, show that in two years our production has increased by almost 50 per cent. As cement and iron have much in common commercially, it is interesting to study the production statistics. While last year's production was 75,699,485 barrels, it was only fifteen years ago that the output reached the dignity of seven figures. In 1880 the total made in the United States was estimated at 42,000 barrels, and in 1890 at 335,500 barrels, accurate returns showing the 1895 production to have been 990,324 barrels. The production since then is shown below, and we have computed the percentage of gain in each year over the preceding year in order to develop whether any uniformity in the rate of increase can be discerned:

Years.	Pro- duction, barrels.	Annual increase, per cent.	Years.	Pro- duction, barrels.	Annual increase, per cent.
1896....	1,543,023	56.0	1904....	26,505,881	18.8
1897....	2,677,775	73.5	1905....	35,246,812	33.1
1898....	3,692,284	37.9	1906....	46,463,424	31.6
1899....	5,652,266	57.5	1907....	48,785,390	5.0
1900....	8,482,020	50.2	1908....	51,072,612	4.9
1901....	12,711,225	50.0	1909....	64,991,431	27.1
1902....	17,230,644	35.7	1910....	75,699,485	16.5
1903....	22,342,973	29.5			

It is at once apparent that there has been a great decline in the rate of increase, comparing the early years in the table with the later years. This, however, was due to the special circumstance that Portland cement did not have the field to itself in the early years. What is known as natural cement was produced in large quantities for a while, the maximum production being reached in 1899, when the output was almost 10,000,000 barrels, or considerably more than the output of Portland cement. In the early nineties the production of Portland cement was negligible, the production of natural cement being fairly large. From about 1895 to about 1902 Portland cement was engaged

largely in replacing natural cement, at the same time taking care of the increase in cement demand. The percentages from 1902 to date are therefore the only ones that need be considered, and here we see clearly a decline in the rate of increase, but even the most conservative view of the table indicates that the rate of increase must be described as very rapid. We all regard the rule of increase in pig iron production, a doubling every ten years, as showing a very rapid rate, yet that rate is maintained by each year's output being 7.2 per cent., not 10 per cent., in excess of that of the previous year. An increase of 7.2 per cent. would look small in the foregoing table, for the years 1907 and 1908 showed relatively insignificant gains, yet those gains were 5 per cent. The evidence of the table is that the rate of increase in the next few years is not likely to be less than from 10 to 15 per cent. per year, which annual rates of increase are equivalent to a doubling of production in from five to seven years.

A few years ago fears were entertained that the rapidly increasing use of concrete would seriously cut into the demand for steel. As for the increased use of cement having measurable effect on the steel industry as a whole, those fears were entirely unfounded. Take the year 1907, for instance. Its production of 48,785,390 barrels was equivalent to about 8,300,000 gross tons, which, with the most common proportions of sand and stone in structural work, would involve a total weight of concrete of perhaps 50,000,000 tons, only double the total production of pig iron in 1907, whereas it was clear that a great deal of concrete is not a remote competitor of steel. The remainder in 1907 was not an impressive tonnage proposition.

Experience of late has shown that the influence of concrete is to increase rather than decrease the consumption of iron and steel, for the reason that the availability of concrete at low cost tends to increase industrial activity along a number of lines, whereby reinforcing bars, sheet piling and various other forms of steel are in greater demand. Even last year's output of cement, 76,699,485 barrels, weighed only 12,800,000 gross tons, equal to the production of perhaps 75,000,000 tons of concrete, while pig iron production in the year was 27,300,000 tons. The proportion of cement to pig iron bids fair to increase year by year, but the growing use of cement will increase rather than decrease the use of iron and steel.

### The Human Obstacle to Evolution

Since time was human frailty typified by selfishness has been a stone in the path of human progress. Opposition has sometimes been excusable. It was not to be expected that the gas works laborers of England could be made to foresee what the introduction of the electric light was going to do for mankind in general and even for them in particular. It was not to be expected that they could imagine the tremendous growth of the artificial illuminating gas business itself. It is charitable to acknowledge that he whose immediate well-being is threatened by the introduction of labor-saving machinery has justification for a pugnacious attitude in view of his limited horizon. But when selfishness arises among those in places of large responsibility and presumably in a position to apprehend large movements, palliation for their economic crime is hard to grant. This slavery to alleged fear of the other man's advantage once he knows our secret may long be with us, but as Kipling says: "They copied all they could follow, but they couldn't copy my mind."

This recurrence to an oft expressed theme is impelled by two notable presidential addresses, one by Henry Souther before the Society of Automobile Engineers, and the other by Dr. Henry M. Howe before the American Society for Testing Materials. Mr. Souther emphasized truly that only those standards can survive which are believed in. He agrees that it is not fair and indeed is rarely necessary to ask that all trade secrets be laid bare, but that sufficient knowledge may be imparted to allow for intelligent procedure—that all personal feeling and trade jealousy should be laid aside for the benefit of all concerned. Then true progress will proceed with less friction. Dr. Howe delivered an address of considerable length offering an outline of the high plane of operation which his society must follow to accomplish its own desires and prove of maximum usefulness to mankind. He dwelt at length on the unwillingness of men as a class to adopt any new thing, each fearing that some unforeseen result of the change may work him harm. One who really believes in himself and his goods, he emphasized, should welcome standards as a measure by which their superiority may be the more readily verified. "He is not really the one to dread the letting in of light, and the education of the public." The trend of the century, Dr. Howe adds, is away from the old piratical idea that the buyer is the seller's reasonable prey to the new idea that he is the seller's employer, but, to get a full measure of the responsibilities and duties which the manufacturer owes to the public, one ought really get a full copy of the address, which may shortly be obtainable in printed form from the society, Prof. Edgar Marburg, University of Pennsylvania, secretary. This has accomplished its mission if it has excited a desire to peruse Dr. Howe's study of the economic side of engineering progress.

### Wholesale Indictments of Business Men

The sensation of the week was the announcement, June 29, that nine indictments had been found by a federal grand jury in New York City against officers of a large number of corporations and members of firms who are charged with participating in pools formed in June, 1908, and continued until November 1, 1909. Each pool formed the basis of an indictment, and the total number of individuals named in the indictment is 83. The pools or associations against which the proceedings are directed comprise the Horseshoe Manufacturers' Association, Bare Copper Wire Association, Rubber Covered Wire Association, Underground Power and Cable Association, Telephone Cable Association, Wire Rope Manufacturers' Association, Weatherproof and Magnet Wire Association, Lead Encased Cable Association and Fine Wire Magnet Association. In addition to the officers of manufacturing companies and members of firms, the supervisor of the several pools, Edwin E. Jackson, Jr., New York City, has also been indicted. The indictments set forth various meetings of the pool members in 1908, 1909 and 1910 as overt acts in the alleged conspiracy.

Among the persons indicted are officers and sales agents of the American Steel & Wire Company, subsidiary of the United States Steel Corporation and officers of other companies as follows: Old Dominion Iron & Nail Works Company, Bryden Horseshoe Company, Phoenix Horseshoe Company, Rhode Island Perkins Horseshoe Company, American Electrical Works, Ansonia Brass & Copper Company, Benedict & Burnham Mfg. Company, Coe Brass Mfg. Company, National Conduit & Cable Company, John A. Roebbling's Sons Company, Standard Underground Cable Company, Crescent Belting & Packing Company, Habirshaw Wire Company, Hazard Mfg. Company, Phillips Insulated Wire Company, Broderick & Bascom Rope Company, A. Leschen & Sons Rope Company, Trenton Iron Company, etc.

A peculiarity of the indictments is that the corporations

and firms interested have not been proceeded against, but the individuals who apparently have at one time or another represented them in the various pools. These pools or associations, it is alleged, did not proceed by verbal agreements but reduced to writing the rules which should govern them. It is charged that the regulation of prices and output was the purpose of the several associations. An intimation is further given through Washington news bureaus that the activities of the Department of Justice will not end with the evidence placed before the New York federal grand jury, but an effort will be made to ascertain if any officials of the United States Steel Corporation had guilty knowledge of any of the pooling agreements.

It is a most serious matter that so many individuals of great prominence in manufacturing and business circles, men of unquestioned high character and personal integrity, should have their reputations blemished by indictments. It is of course a long step from an indictment to a conviction. The Bache Review caustically characterizes these indictments as "merely a border skirmish in the contest which is being carried on against business by politics."

### United States Cast Iron Pipe & Foundry Company

In the report of the United States Cast Iron Pipe & Foundry Company, for the year ending May 31, the income account is given as follows:

	1911	1910
Gross income from operations.....	\$536,711	\$636,711
Other income.....	93,798	66,580
Total income.....	\$630,509	\$703,291
Interest on P. & F. bonds.....	90,000	90,000
Net earnings.....	\$540,509	\$613,292
Reserve for improvements.....	44,140	54,900
Reserve for doubtful accounts.....	12,000	12,000
Balance .....	\$484,369	\$546,392
Amount transferred from reserve for additional working capital.....	250,000	200,000
Previous surplus.....	35,511	164,120
Total surplus.....	\$769,880	\$910,511
Preferred dividend.....	625,000	875,000
P. & L. surplus.....	\$144,880	\$35,511

The balance of \$484,369 above given is equal to 3.38 per cent. on the \$12,500,000 preferred stock as against 4.37 per cent. earned on the same stock last year. The general balance sheet, with a comparison with 1910, is as follows:

ASSETS.		
	1911	1910
Cost of property.....	\$24,084,986	\$24,106,731
Treasury stock at cost.....	347,555	347,555
Bonds, American Pipe & Foundry Company	611,913	611,543
Raw and manufactured materials.....	2,599,992	2,730,633
Accounts and bills receivable.....	3,020,324	3,349,557
Cash .....	382,790	363,109
Total .....	\$31,047,559	\$31,509,128
LIABILITIES.		
	1911	1910
Preferred stock.....	\$12,500,000	\$12,500,000
Common stock.....	12,500,000	12,500,000
A. P. & F. Co. bonds.....	1,500,000	1,500,000
Dividends declared.....		
Accounts and bills payable.....	2,469,402	2,794,257
Reserve for additional working capital.....	1,800,000	2,050,000
Reserve for insurance fund.....	100,000	100,000
Reserve for doubtful accounts.....	33,276	29,360
Surplus .....	144,881	35,511
Total .....	\$31,047,559	\$31,509,128

At the annual meeting of the company, Colgate Hoyt, Jr., was elected a director to succeed David Giles, deceased.

### Lewis Foundry & Machine Company Contracts.—

The Lewis Foundry & Machine Company, Groveton, Pa., near Pittsburgh, has recently made shipments as follows: Pacific Coast Steel Company, San Francisco, Cal., one No. 3 roll lathe; Sweet Steel Company, Williamsport, Pa., one 9-in. mill with five stands, one No. 1 roll lathe, one 14-in. train with seven stands of rolls and two stands of pinions, and has contracts from the same company for two mill tables and drives and three cropping shears. Among other contracts under way is one from the Whitaker-Glessner Company, Wheeling, W. Va., for six 24-in. cold mills and gear drive and another from the Reeves Mfg. Company, Canal Dover, Ohio, for seven of finishing mills, three stands of cold mills, 56-in. squaring shear, roll lathe, 26-in. squaring shear, 48-in. steam doubler, four 36-in. doubling shears, etc. Operations in full over the next three months are insured, while the company is also figuring on considerable other work.



**Foos Kerosene Engine Economy.**—In an article now in preparation the Foos Gas Engine Company, Springfield, Ohio, will give data collected from actual power-plant experience with its engines operating on petroleum and distillates, showing remarkable reliability and economy. Comparison is made between the Foos engine using kerosene at 5 cents a gallon and a gasoline engine using 12 cent fuel. A 10-hour day with a 25 hp. oil engine at full load shows a fuel cost of but \$1.55. A gasoline engine under the most favorable conditions, it is stated, would use  $31\frac{1}{4}$  gal. of fuel, which, at 12 cents, would cost \$3.75. A total saving for 300 working days would thus give the oil engine a lead of \$660 a year. As a matter of fact, the advantage in favor of the oil engine is shown to be even greater. Kerosene can be bought as low as 4 cents and in many fields oils are available at  $2\frac{1}{4}$  cents.

**The Ward Nail Company.**—It is the intention of the Ward Nail Company, which recently started its new plant at Struthers, Ohio, to limit its production for the present to large head roofing nails, and for a time its capacity will not be over 10 tons per day. The initial equipment will be five of the Ward pneumatic nail machines. In this type of machine compressed air is used for driving, and it promises to give very successful results. It is stated that all kinds of wire nails can be made on a Ward machine at a very high rate of speed, and large head nails can also be made successfully and quickly, while with the ordinary types of nail machines more or less trouble has been encountered in making large head nails.

The Linde Air Products Company, Buffalo, N. Y., has shipped a complete oxy-acetylene cutting plant, arranged for six operators, to the War Department for use in conjunction with the salvage of the Maine in Havana harbor. Much of the work involved is the cutting of 9-in. armor plate, in addition to the usual structural shapes. It is interesting to note that similar apparatus to this was used with signal success in connection with the removal of the debris of the Quebec bridge.

The Youngstown Vindicator, Youngstown, Ohio, publishes a special issue which contains a large number of exceedingly interesting articles relating to the great importance of the industries of that city. It gives a list of 735 separate and distinct articles which are made there by 92 incorporated companies and individual manufacturers, of which 28 are directly concerned in the iron and steel industry. Illustrated descriptions are presented of several of the most important manufacturing plants. Among the leading articles is one on the prevention of accidents in the large mills, showing the extent to which Youngstown manufacturers are adopting appliances for safeguarding their workmen. Additions which are now being made to the city's manufacturing industries are described, and its continued growth in manufacturing importance and population is confidently predicted.

**Cambria Wire & Nail Catalogue.**—The Cambria Steel Company, Johnstown, Pa., has just issued its new 1911 wire and nail catalogue. The publication is  $3\frac{1}{2} \times 6\frac{1}{2}$  in., 44 pages, with tables and illustrations covering fence wire, coil spring steel wire, Cambria barb wire, Cambria fence staples, bale ties, common nails, common and flooring brads, finishing and casing nails, smooth and barbed box nails, etc. A copy may be had by addressing the Wire Sales Department.

The new lake freighter, the Col. J. M. Schoonmaker, the largest vessel on the lakes and said to be the largest bulk freighter in the world, was launched at the Ecorse yards of the Great Lakes Engineering Works July 1. This boat is one of two of similar size being built for the William P. Snyder interests of Pittsburgh. It is 617 ft. long, 64-ft. beam, and will have an ore-carrying capacity of 14,000 tons. The boat is named in honor of the vice-president of the Pittsburgh & Lake Erie Railroad.

The Tennessee Coal, Iron & Railroad Company has placed an order with the General Electric Company for four 18-ton a.c. locomotives. These will be 220-volt, three-phase, 25-cycle locomotives, and their service will consist chiefly of switching and placing cars in and about the company's plants at Ensley and Corey, Ala.

## The American Car & Foundry Company's Year

The annual report of the American Car & Foundry Company for the fiscal year ended April 30, shows net earnings of \$6,240,324, an increase of \$515,226. After allowing for the preferred dividend the company had a balance of \$2,134,789, equal to 7.01 per cent. on the \$30,000,000 common stock, as against 6.63 per cent. earned on the same stock last year.

The income account of the year, compared with 1910, is as follows:

	1911	1910
Net earnings.....	\$6,240,324	\$5,725,098
Renewals, replacements, repairs, etc.....	2,005,536	1,635,620
Balance available for dividends.....	\$4,234,789	\$4,089,478
Preferred dividends.....	2,100,000	2,100,000
Balance.....	\$2,134,789	\$1,989,478
Common dividend.....	600,000	600,000
Surplus.....	\$1,534,789	\$1,389,478
Maintenance and improvements.....	750,000	.....
Surplus.....	\$784,789	\$1,389,478
Previous surplus.....	23,952,556	22,563,078
P. & L. surplus.....	\$24,737,345	\$23,952,556

The general balance sheet as of April 30, 1911, compares with 1910 as follows:

	1911	1910
<b>ASSETS.</b>		
Cost property.....	\$66,432,532	\$66,182,522
Stocks, bonds other companies.....	1,098,785	701,869
Material on hand.....	9,103,577	18,763,233
Accounts and notes receivable.....	9,122,032	12,278,782
Cash.....	6,485,429	2,941,561
Bank certificates on deposit.....	1,000,000	.....
Total.....	\$93,242,357	\$100,867,967
<b>LIABILITIES.</b>		
Preferred stock.....	\$30,000,000	\$30,000,000
Common stock.....	30,000,000	30,000,000
Audited vouchers and payroll.....	3,923,611	12,050,224
Insurance reserve.....	1,000,000	1,000,000
Reserve for improvements, maintenance, etc.....	1,028,606	628,167
Reserve for payment Wilmington plant.....	.....	500,000
Reserve for steel car plant.....	1,277,795	1,462,021
Surplus account.....	24,737,345	23,952,556
Dividends payable July.....	675,000	675,000
Reserve for common.....	600,000	.....
Total.....	\$93,242,357	\$100,867,967

President Eaton reviewed the condition of the company's affairs, in part as follows: "Your company begins the fiscal year 1911-1912 with fewer cars on its books than it had at the beginning of the year 1910-1911. At the close of the fiscal year the railroads were not in the market for the purchase of new equipment in any considerable quantity. It is not to be assumed that this condition will continue without change.

"During the past year an additional shop at St. Charles has been finished and our all-steel passenger car plant at St. Charles is now practically complete. For this work and for additions to our plants at Berwick, Detroit, Chicago and Milton there was expended of our reserve for construction of and additions to steel car plants the sum of \$434,225.

"During the year \$500,000, representing the price agreed to be paid for the purchase of the real estate and buildings at Wilmington, has been expended for that purpose, and your company now owns that property in fee and free of all encumbrances. As an incident of this purchase your company acquired the entire outstanding capital stock of the Jackson & Sharp Company, the former owner of the Wilmington plant.

"A great deal of attention has been given to the building up of the export business. Due to various causes this field is one difficult of entry, but the company has had a fair measure of success in it in the past which, with proper effort, may be continued in the future. Several contracts for passenger cars for export were entered during the year, shipments under which have been commenced."

The McInnes-McCleary Foundry Company, composed of Colin McInnes and J. P. McCleary, succeeds the Wellsburg Foundry & Machine Company, Wellsburg, W. Va., making a specialty of glass house furnaces, lehrs, vanadium mold castings, etc.

Solomon Brothers, Knox street, North Side, Pittsburgh, dealers in iron and steel products, scrap, etc., recently purchased the equipment in the plants of the Crystal Glass Company, Bridgeport, Ohio, and Riverside Glass Works, Wellsburg, W. Va., and are dismantling the plants and selling the machinery.

## June Pig Iron Production Falls 1494 Tons a Day Under May Output

### The Decline Confined to Merchant Furnaces

June, a 30-day month, shows an output of 1,787,566 gross tons of coke and anthracite pig iron in the United States, against 1,893,456 tons in the 31 days of May. The falling off was 105,890 tons, as compared with a decline in production of 171,630 tons in May. The daily output in June was 59,585 tons, which is 1494 tons under the daily rate of production in May. This is the lowest rate of any month of this year since January, when the daily output was 56,752 tons.

It is interesting to note that the decline in the June output was confined to the merchant furnaces. The furnaces connected with steel plants maintained a daily rate of production of 42,708 tons, against 42,270 tons in May. These figures substantiate the reports of an improvement in the steel trade in June. The July pig iron figures will doubtless show this tendency more strongly.

The collection of the June figures enables an estimate to be made of the total production of pig iron in the first six months of 1911. Our figures by months show an aggregate of 11,470,054 tons of coke and anthracite pig iron, to which an estimated production of 160,000 tons of charcoal pig iron is to be added, making a total of 11,630,054 tons, against 12,319,807 tons produced in the last half of 1910, according to the authentic statistics of the American Iron and Steel Association. This would make the falling off in the first half of this year a little over 5 per cent., as compared with the last half of last year.

### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with June, 1910, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel works.	Merchant.	Total.
June, 1910 .....	51,637	23,879	75,516
July .....	47,183	22,122	69,305
August .....	46,534	21,429	67,963
September .....	47,007	21,536	68,542
October .....	45,794	21,726	67,520
November .....	41,427	22,232	63,659
December .....	35,909	21,440	57,349
January, 1911 .....	36,401	20,351	56,752
February .....	42,349	21,741	64,090
March .....	48,970	21,066	70,036
April .....	47,805	21,031	68,836
May .....	42,270	18,809	61,079
June .....	42,708	16,877	59,585

### Capacity in Blast July 1 and June 1

The following table shows the daily capacity of furnaces in blast July 1 and June 1:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	July 1. Number in blast.	July 1. Capacity per day.	June 1. Number in blast.	June 1. Capacity per day.
New York:					
Buffalo .....	17	12	4,056	12	4,049
Other New York .....	7	3	495	1	164
New Jersey .....	7	1	183	1	183
Spiegel .....	2	..	..	..	..
Pennsylvania:					
Lehigh Valley .....	24	11	1,976	13	2,497
Spiegel .....	3	2	145	1	75
Schuylkill Valley .....	16	6	1,468	6	1,429
Low. Susquehanna .....	7	3	611	3	616
Lebanon Valley .....	10	5	780	5	831
Pittsburgh district .....	50	35	14,367	35	14,717
Spiegel .....	3	2	340	1	150
Shenango Valley .....	20	7	2,368	8	2,618
West. Penn. .....	27	8	2,520	9	2,700
Maryland .....	4	3	706	3	728
Wheeling district .....	14	9	3,120	10	3,547
Ohio:					
Mahoning Valley .....	23	17	6,615	15	5,685
Central and North .....	22	9	3,350	13	4,932
Hocking Val., Hanging Rock and S.W. Ohio .....	15	3	407	6	865
Illinois and Indiana .....	34	22	8,735	20	7,935
Mich., Wis. and Minn. ....	10	4	752	5	1,029
Colo., Mo. and Wash. ....	7	4	1,117	4	1,102
The South:					
Virginia .....	23	5	650	6	745
Kentucky .....	5	2	245	1	81
Alabama .....	46	16	4,148	17	4,335
Tenn. and Georgia .....	20	8	825	8	831
Total .....	416	197	59,979	203	61,844

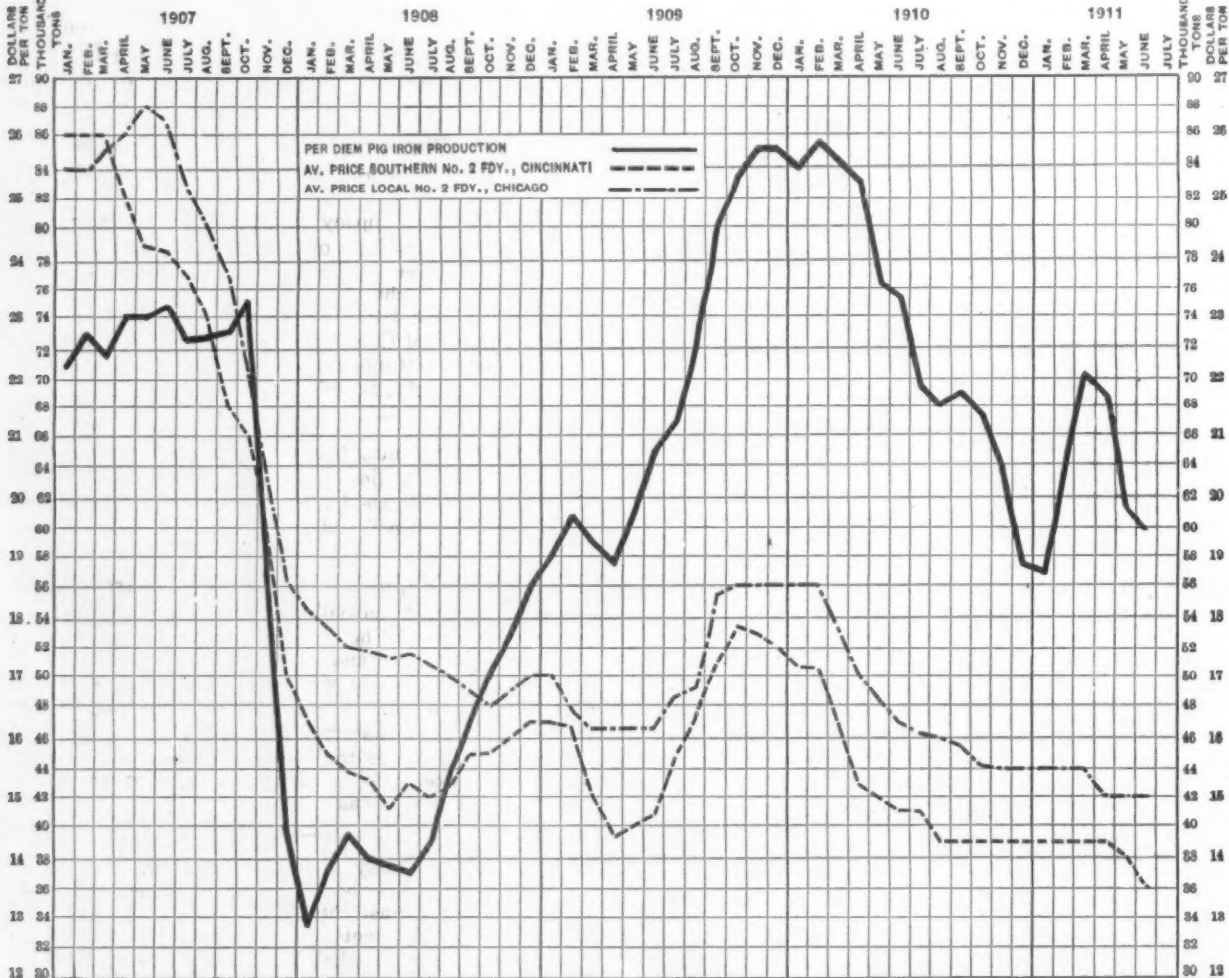


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to July 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace.





# The Iron and Metal Markets

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type, Declines in Italics.

	At date,	one week,	one month and	one year previous.
	July 5	June 28	June 7	July 6
	1911.	1911.	1911.	1910.
<b>PIG IRON, Per Gross Ton:</b>				
Foundry No. 2, standard, Philadelphia	\$15.00	\$15.00	\$15.00	\$16.25
Foundry No. 2, Valley furnace	13.50	13.50	13.75	14.50
Foundry No. 2, Southern, Cincinnati	13.25	13.25	13.75	14.75
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.50	11.50
Foundry No. 2 local, at furnace, Chicago	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa.	14.50	14.50	14.50	15.75
Basic, Valley furnace	13.25	13.00	13.10	14.50
Bessemer, Pittsburgh	15.90	15.90	15.90	16.40
Gray forge, Pittsburgh	13.90	13.90	14.15	14.90
Lake Superior charcoal, Chicago	16.50	16.50	17.00	18.50

### COKE, CONNELLSVILLE,

Per Net Ton, at oven:				
Furnace coke, prompt shipment	1.45	1.40	1.45	1.60
Furnace coke, future delivery	1.60	1.60	1.70	1.80
Foundry coke, prompt shipment	1.85	1.80	1.75	2.15
Foundry coke, future delivery	2.10	2.10	2.00	2.25

### BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	21.00	21.00	21.00	25.00
Forging billets, Pittsburgh	26.00	26.00	26.00	30.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	28.50
Wire rods, Pittsburgh	27.00	27.00	29.00	30.00

### OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.00	14.00	14.00	17.00
Iron rails, Philadelphia	16.50	16.50	16.75	19.00
Car wheels, Chicago	12.50	12.50	12.50	15.00
Car wheels, Philadelphia	13.00	13.00	13.00	14.50
Heavy steel scrap, Pittsburgh	13.00	13.00	13.00	15.00
Heavy steel scrap, Chicago	10.25	10.25	10.25	12.75
Heavy steel scrap, Philadelphia	13.00	13.00	13.00	14.25

### FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.27½	1.27½	1.27½	1.47½
Common iron bars, Pittsburgh	1.25	1.25	1.25	1.50
Common iron bars, Chicago	1.20	1.20	1.20	1.40
Steel bars, Pittsburgh	1.25	1.25	1.25	1.45
Steel bars, tidewater, New York	1.41	1.41	1.41	1.61
Tank plates, Pittsburgh	1.35	1.35	1.35	1.45
Tank plates, tidewater, New York	1.51	1.51	1.51	1.61
Beams, Pittsburgh	1.35	1.35	1.35	1.45
Beams, tidewater, New York	1.51	1.51	1.51	1.61
Angles, Pittsburgh	1.35	1.35	1.35	1.45
Angles, tidewater, New York	1.51	1.51	1.51	1.61
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

### SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.00	2.30
Wire nails, Pittsburgh	1.70	1.70	1.80	1.80
Cut nails, Pittsburgh	1.60	1.60	1.60	1.75
Barb wire, galvanized, Pittsburgh	2.00	2.00	2.10	2.10

### METALS,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.87½	12.87½	12.45	12.75
Electrolytic copper, New York	12.62½	12.62½	12.25	12.37½
Spelter, St. Louis	5.60	5.45	5.25	5.05
Spelter, New York	5.80	5.65	5.55	5.20
Lead, St. Louis	4.35	4.35	4.22½	4.25
Lead, New York	4.50	4.50	4.37½	4.40
Tin, New York	45.40	45.00	48.25	32.80
Antimony, Hallett, New York	8.12½	8.25	8.75	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

\* The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

† These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, No. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

**Structural Material.**—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15-in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.40c.,

plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; tees, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge, extra	\$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft and over.	
Terms—Net cash 30 days.	

**Sheets.**—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; No. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following basic prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	.....	\$2.40	23	\$2.40	\$3.50
28	\$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

Butt Weld.					
		Steel		Iron	
		Black.	Galv.	Black.	Galv.
1 to 1½ in.	..	..	..	49	43
¾ in.	75	63	71	59	59
¾ to 1½ in.	79	69	75	65	65
2 to 3 in.	80	70	76	66	66
Lap Weld.					
2 in.	76	66	72	62	62
2½ to 4 in.	78	67	74	64	64
4½ to 6 in.	77	67	73	63	63
7 to 12 in.	75	59	71	55	55
13 to 15 in.	51½	..	..	..	..
Lap Weld, extra strong, plain ends, card weight.					
2 in.	75	69	71	65	65
2½ to 4 in.	77	71	73	67	67
4½ to 6 in.	76	70	72	66	66
7 to 8 in.	69	59	65	55	55
9 to 12 in.	64	54	60	50	50



# THE IRON AND METAL MARKETS

Butt Weld, double extra strong, plain ends, card weight.			
1/2 in. ....	64	58	60
3/4 to 1 1/2 in. ....	67	61	63
2 to 3 in. ....	69	63	65
Lap Weld, double extra strong, plain ends, card weight.			
2 in. ....	65	59	61
2 1/2 to 4 in. ....	67	61	63
4 1/2 to 6 in. ....	66	60	62
7 to 8 in. ....	59	49	55

Plugged and Reamed.

1 to 1 1/2, 2 to 3 in. Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe. Butt or lap weld, as specified.
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2, 2 1/2 to 4 in. .... Lap Weld

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

**Boiler Tubes.**—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1 3/4 to 2 1/2 in. ....	Steel.
2 1/2 in. ....	65
2 3/4 to 3 1/4 in. ....	67 1/2
3 1/2 to 4 1/2 in. ....	70
5 to 6 in. ....	72 1/2
7 to 13 in. ....	65
	62 1/2

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

**Wire Rods and Wire.**—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.50, galvanized \$1.80; carload lots, to retailers, annealed, \$1.55, galvanized \$1.85. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails, to jobbers, \$1.70.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

No.	0 to 9	10	11	12 & 12 1/2	13	14	15	16
Annealed	\$1.65	1.70	1.75	1.80	1.90	2.00	2.10	2.20
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80

**Market and Stone Wire in Bundles, Discount from Standard List.**

Bright and Annealed:

9 and coarser .....80

10 to 18.....80 and 10

19 to 26.....80 and 10 and 2 1/2

27 to 36.....80 and 5

Galvanized:

9 and coarser.....75 and 10

10 to 16.....75 and 10

17 to 26.....72 1/2 and 10

27 to 36.....72 1/2

Coppered or Liquor Finished:

9 and coarser.....75 and 10

10 to 26.....75 and 10

27 to 36.....70 and 10 and 5

Tinned:

6 to 18.....75 and 10 and 10

## Iron and Industrial Stocks

NEW YORK, July 5, 1911.

Summer relaxation and government investigations are causing restriction in stock market transactions. While dullness thus prevails, stocks continue to show firmness. The range of prices on active iron and industrial stocks from Wednesday of last week to Monday of this week was as follows:

Allis-Chalmers, pref. ....	29 1/2	Railway Spring, com. 35	- 37
Beth, Steel com. ....	32 3/4 - 33 3/4	Republic, com. ....	30 - 30 1/2
Beth, Steel, pref. ....	62 - 63 1/4	Republic, pref. ....	93 3/4 - 93 3/4
Can, com. ....	10 3/4 - 10 7/8	Sloss, com. ....	49 3/4 - 50 3/4
Can, pref. ....	84 1/2 - 85 1/2	Pipe, com. ....	16 1/2 - 17
Car & Fdry, pref. ....	116	Pipe, pref. ....	57 1/2
Steel Foundries ....	41 1/2	U. S. Steel, com. ....	78 - 79 1/4
Steel Foundries ....	41 1/2	U. S. Steel, pref. ....	117 3/4 - 118 3/4
Colorado Fuel ....	34 1/2 - 34 3/4	Westg. Elec. ....	75 1/2 - 75 5/8
General Electric ....	160 - 162	Va. I. C. & C. ....	71 1/2 - 72
Gr. N. Ore Cert. ....	60 1/2 - 62 1/4	Am. Ship, com. ....	64 - 66
Int. Harvester, com. ....	121 1/2 - 122 1/4	Chic. Pneu. Tool. ....	50 3/4 - 51
Int. Pump, com. ....	41 - 43 1/4	Cambria Steel ....	44 3/4 - 45
Int. Pump, pref. ....	89 1/2	Lake Sup. Corp. ....	25 1/4 - 26
Locomotive, com. ....	40 1/2 - 41	Warwick ....	10
Nat. E. & St. com. 18	- 20 1/4	Crucible Steel, com. ....	13
Nat. E. & St. pref. ....	96 3/4 - 97	Crucible Steel, pref. ....	81 1/2 - 82
Pressed Steel, com. ....	36	Harb. Walk Ref., pr. 98	-

## Dividends

The Reece Buttonhole Machine Company, quarterly, 2 per cent., payable July 15.

The Reece Folding Machine Company, quarterly, 1 per cent., payable July 15.

The International Buttonhole Sewing Machine Company, quarterly 1 per cent., payable July 15.

The American Rolling Mill Company, quarterly, 3 per cent. on the common and 1 1/2 per cent. on the preferred, payable June 30.

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable July 25.

The National Fire Proofing Company, regular quarterly, 1 per cent. payable July 15.

## Pittsburgh

PARK BUILDING, July 4, 1911.

The iron trade enters the month of July under much more favorable conditions than have existed for a long time. Indications are that the long-hoped-for improvement in trade has actually started. The heads of selling departments of a number of steel companies state that in the second half of June new orders and specifications showed a very material increase, and inquiries on nearly all kinds of material were much better. In June the rail and billet sales department of the Carnegie Steel Company showed an increase of more than 60,000 tons over May in actual orders and specifications sent to the mills. The structural steel and plate departments of the same company report an increase in June business over May of over 20 per cent. A very large amount of structural work and plates is now in the market. The new demand and specifications for sheets showed a large increase in June over May, and on two or three other lines increases in actual orders are reported. There is decided improvement in inquiries for pig iron and prices are firmer on basic. It is claimed that on present prices of ore and coke basic iron cannot be made and sold at a profit at \$13 a ton, and in the past week several Valley furnaces have quoted \$13.50 at furnace on inquiries and refuse to shade this business. The basic iron obtained by several scrap dealers in exchange for scrap has all been disposed of, and this has strengthened the market. New inquiries for foundry iron are quite active and several fairly large lots have been closed. The scrap trade is showing more life with prices ruling firm. The market on prompt furnace coke is also stronger, due to continued heavy purchases by a local consumer, which are now running upward of 2000 tons a day. This consumer makes its own coke, but owing to labor troubles at its mines up the Monongahela River it has not been able to mine any coal and is compelled to buy its supply of furnace coke.

**Pig Iron.**—More actual tonnage of pig iron has been sold in the past week than in any one week for some months and new inquiries are better and for larger tonnages. A radiator company at Johnstown, Pa., closed late last week for about 3000 tons of Northern No. 2 foundry iron for delivery over remainder of this year and another local consumer has closed for about 1500 tons of Northern No. 2 foundry for same delivery on the basis of about \$13.50 at Valley furnace. An inquiry is in the market for 3000 tons of Bessemer iron for third quarter delivery and this is expected to be closed at slightly under \$15 at Valley furnace. A sale is reported of 500 tons of forge iron for July and August at \$13 Valley. Heavy inquiries for basic pig iron are in the market, and it is believed these amount to fully 30,000 tons or more. The Shenango Furnace Company will blow out its No. 1 stack at Sharpsville, Pa., for relining and improvements, while Tod furnace, of the Youngstown Steel Company, will probably go out this week. A sale of 200 tons of Bessemer pig iron is reported to have been made by a Valley furnace at \$15 at furnace for July shipment. The average price of Bessemer iron in June was nominally \$15 at Valley furnace, but half a dozen small sales were made by dealers at prices ranging from \$14.75 to \$14.85 at furnace. The average price of basic iron for June was \$13.06 at Valley furnace, but actual sales were made below that figure last month. We quote as follows: Bessemer pig iron, nominally, \$15; malleable Bessemer, \$13.50; basic, \$13.25; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace, the freight rate to Pittsburgh being 90c. per ton.

**Steel.**—Several of the large steel mills report that regular prices on Bessemer and open hearth billets, sheet bars and forging billets are being firmly maintained. A local interest reports a sale of 1000 tons of open hearth sheet bars for July and August at \$22, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in., and up to but not including 10 x 10 in., \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1 1/2-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

**Ferromanganese.**—Inquiries are reported for several fair sized lots of ferromanganese for delivery in third quarter, but most consumers are covered over remainder of the year. The increase in operations of the steel companies will mean an increased consumption of ferromanganese, and shipments to consumers are expected to be heavier in the near future than they have been for some time. A sale of three cars, or about 90 tons, is reported to a local consumer at \$36.50, Baltimore. We quote foreign 80 per cent. at \$36.50 with a

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freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

**Ferrosilicon.**—There have been no sales in the past week and no new inquiries are reported, most consumers being covered for remainder of the year. We quote 50 per cent. at \$51.50 to \$52, Pittsburgh, for delivery over second half of the year; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars Ashland and Jisco furnaces.

**Muck Bar.**—A sale of 500 tons of standard grade muck bar to a local consumer for July delivery is reported on the basis of about \$28.50 delivered. We quote best grades of muck bar made from all pig iron, at \$28.50 to \$29, Pittsburgh, one or two makers refusing to quote less than the latter price.

**Skelp.**—A little more new inquiry is noted, but several consumers will close down their plants for the next two weeks to take inventory and repairs and are holding up shipments until these have been completed. A sale of 1000 to 1200 tons of wide sheared iron plates for July and August delivery is reported at about 1.70c. delivered. We quote grooved steel skelp at 1.25c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.50c. to 1.60c., and sheared iron skelp, 1.70c. to 1.75c., usual terms, all for delivery at consumers' mills in the Pittsburgh district.

**Wire Rods.**—The recent reduction in prices of wire rods has brought out some new inquiry, and specifications against contracts are reported as being heavier. We note a sale of 500 tons of Bessemer rods and one of 750 tons of open hearth rods for delivery over the next four months on the basis of \$27, Pittsburgh. We quote Bessemer, open hearth and chain rods at \$27, Pittsburgh.

**Steel Rails.**—A Southern railroad is in the market for 25,000 tons and the Texas Pacific is expected to close this week for 16,000 tons. In the past week the Carnegie Steel Company received new orders and specifications for 2500 tons of light rails and also sold a sufficient quantity of Duquesne rail joints to lay about 25,000 tons of rails for a leading Eastern trunk line. The Cambria Steel Company has taken an order for 7,000 tons of standard sections for the Baltimore & Ohio Railroad. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market in carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c per pound.

**Structural Material.**—A good deal of new work has been closed and a very large tonnage is pending. The McClintic-Marshall Construction Company has received 1700 tons additional steel for bridges for the Western Maryland Railroad and 500 tons of bridge work for a southern road. This company has also taken 1800 tons of steel for new buildings for the American Sugar Refining Company of Brooklyn, N. Y. Bids on the Kansas City Terminal requiring 14,000 tons of steel have been postponed until July 12. It is estimated that 150,000 tons of steel will be required for new work coming up in Cincinnati. This includes a new Union Station, elevated tracks and other work, and is expected to come out before long. Bids will be asked for in July on the steel for the Point Bridge in this city about 1500 tons. The Henry Shenk Company is the lowest bidder on a large new hotel at Erie, Pa., which will take 1200 to 1500 tons of steel. Prices on fabricated work are reported firmer and several leading concerns report they are asking higher figures. We quote beams and channels up to 15-inch at 1.35c., Pittsburgh.

**Plates.**—The Pressed Steel Car Company has an order from the Louisville & Nashville Railroad for 500 steel underframes, the Bettendorf Steel Axle Company an order for 250 steel underframes and the Mount Vernon Car Mfg. Company, Mt. Vernon, Ill., an order for 250 steel underframes, all for the Louisville & Nashville Railroad for 1000 box cars which this road will build at its own shops at Louisville, Ky. The Cambria Steel Company has received an order for 200 steel hopper cars of 100,000 lbs. capacity for the Cambria & Indiana Railroad, and the Western Steel Car & Foundry Company has an order for 1000 steel underframes to be used in building 1000 box cars for the Northern Pacific Railroad, which that road will build in its own shops. The Canadian Car & Foundry Company has an order for 1000 box cars for the Grand Trunk Railway. The Erie Railroad is in the market for about 4000 cars of six different types and the steel car companies are now figuring on this inquiry. The Boston Elevated has an inquiry out for 50 steel car bodies, the Mon-

treteal Street Railway Company for 25 and the Frisco system is in the market for 35 steel passenger cars. The 4000 tons of plates for the Los Angeles aqueduct, for which the Treadwell Construction Company, Midland, Pa., has the contract, will be rolled by a local mill. Leading plate mills are now operating to larger capacity than for some time. We quote ¼-in. and heavier plates at 1.35c., Pittsburgh.

**Sheets.**—In the last two weeks in June more new orders and specifications against contracts for black, galvanized and roofing sheets were placed than in any similar period for a long time. The leading sheet makers report that new orders are steadily increasing and specifications against contracts are coming in more freely. The American Sheet & Tin Plate Company is now operating to about 65 per cent. of capacity and expects to put on more sheet mills in the near future. The independent sheet mills are also operating to larger capacity and the whole sheet trade is in more satisfactory condition than for some time. The settlement of the sheet and tin plate scales with the Amalgamated Association precludes any labor troubles this year. On a previous page is given the full schedule of prices now in effect on black, galvanized and roofing sheets.

**Tin Plate.**—Very few new contracts for tin plate are being made, as this is the dull season, but specifications against contracts received in the last two weeks in June were heavier than in the first half. Some of the independent tin plate mills are running to nearly full capacity and as the independent tin plate mills have made a settlement of the tin plate scale with the Amalgamated Association there will not be any labor troubles in the tin plate mills this year. A few mills have closed down for inventory and repairs, but will start again as soon as these have been finished. It is estimated that about 65 per cent. of the tin plate capacity is active at present. We quote 100-lb. cokes, 14 x 20, at \$3.70 per base box f.o.b. Pittsburgh.

**Bars.**—Makers of steel bars state that during this month they expect to secure a number of large contracts for steel bars from implement makers that have not as yet covered their requirements for the year beginning July 1. A fair amount of new tonnage has been placed in contracts, but it is very much less than usual at this time of the year. Makers of iron bars report a slight increase in new orders, but specifications are unsatisfactory. We quote steel bars at 1.25c. and common iron bars at 1.25c. to 1.30c., Pittsburgh.

**Rivets.**—New orders and specifications for rivets in the last two weeks in June were heavier than the first half of that month. There is a good deal of new inquiry and makers anticipate that considerable tonnage will be placed this month. We quote structural rivets at 1.70c. to 1.75c. and boiler rivets at 1.80c. to 1.85c., these prices being shaded only on most desirable orders.

**Wire Products.**—New orders for wire nails and wire continue to be confined to small lots to cover actual needs and specifications against contracts are dull and unsatisfactory. It is believed that July and August will be very quiet months in the wire trade, but an increase in new demand is expected early in September. We quote galvanized barb wire at \$2 per 100 lb.; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, about \$1.60, f.o.b. Pittsburgh, full weight added to point of delivery. The quotation of \$1.60 on cut nails might be shaded on a desirable order.

**Spikes.**—Spike makers report that new orders from the railroads are mostly for small lots for repair work. We quote railroad spikes at \$1.50 base per keg for standard sizes f.o.b. Pittsburgh, the usual extras being charged over this price for odd sizes.

**Shafting.**—New orders and specifications for shafting continue to be confined to small lots to cover actual needs, and shipments by the makers in June were only fairly heavy. The implement makers are expected to commence to specify more liberally against their contracts about August 1, and it is believed that within a short time regular demand will be better. Stocks in the hands of jobbers and consumers are reported as unusually low. Regular discounts on shafting remain at 60 per cent. off in carloads and 55 per cent. in less than carloads, but on desirable orders these discounts are still being shaded.

**Spelter.**—Prices have shown a further decline during the week. We quote prime grades of Western spelter at 5.50c. East St. Louis, equal to 5.62½c. Pittsburgh.

**Hoops and Bands.**—Specifications against contracts for hoops and bands in the last two weeks in June are reported as having been slightly better than in the first



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half, but the new demand continues to be confined to small lots to cover actual needs. We quote hoops at 1.40c. and bands at 1.25c., extras on the latter as per the steel bar card.

**Merchant Steel.**—A leading mill reports that its shipments against orders and specifications in June exceeded May by nearly 25 per cent. New orders are reported a little better and specifications are said to be coming in more freely. Quotations, which, however, are being shaded, are as follows: Iron finished tire,  $\frac{1}{2}$  x  $1\frac{1}{2}$  in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

**Merchant Pipe.**—New orders for merchant pipe are only fairly satisfactory, the actual tonnage entered by a number of the leading pipe mills in June having been less than in May. No large gas or oil lines are in the market, with the exception of one project for taking natural gas from the western Virginia fields to Detroit, Mich., and which if it goes through will require upward of 300 miles of large pipe. Regular discounts in effect on iron and steel pipe are given on a previous page.

**Boiler Tubes.**—The market on boiler tubes continues in very unsatisfactory condition, both from the standpoint of new demand and prices. Regular discounts continue to be more or less shaded.

**Iron and Steel Scrap.**—A number of finishing mills that are fairly large users of scrap closed down their plants June 30 for inventory and repairs and this will restrict consumption of scrap for the time being. An embargo has also been placed on scrap destined for Monessen, Pa., but this is expected to be lifted this week. The tone of the scrap market is firmer, but consumers have fairly large stocks and are inclined to hold off buying until these have been materially reduced. We note sales of about 1000 tons of heavy steel scrap for July shipment at \$13 to \$13.25 delivered in the Pittsburgh district; a sale of 500 tons of cast iron borings at \$8.85 delivered, and a sale of 1000 tons of machine shop turnings at \$9.15 delivered. Dealers are now quoting per gross ton, f.o.b. Pittsburgh, as follows:

Heavy steel scrap Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.	\$13.00 to \$13.25
No. 1 foundry cast.	13.25 to 13.50
No. 2 foundry cast.	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district.	10.75 to 11.00
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock.	12.00 to 12.25
Grate bars.	10.50 to 10.75
Low phosphorus melting stock.	16.00 to 16.25
Iron car axles.	23.75 to 24.00
Steel car axles.	18.50 to 18.75
Locomotive axles.	23.00 to 23.00
No. 1 busheling scrap.	12.00 to 12.25
No. 2 busheling scrap.	8.50 to 8.75
Old car wheels.	13.50 to 13.75
Sheet bar cut ends.	15.50 to 15.75
*Cast from borings.	8.75 to 9.00
*Machine shop turnings.	9.00 to 9.25
Old iron rails.	15.00 to 15.25
No. 1 wrought scrap.	14.25 to 14.50
Heavy steel axle turnings.	10.00 to 10.25
Stove plate.	10.50 to 10.75

\*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

**Coke.**—The demand for spot furnace coke has been very active in the past two or three weeks, due to the fact that a local blast furnace interest that mines its own coal up the Monongahela River, and makes it into coke in the Pittsburgh district, has had serious labor troubles at its coal mines, which have been shut down for several weeks. This concern started out by buying from 800 to 1000 tons of spot furnace coke per day, and has lately run its purchases up to 2000 tons a day. The company will not buy any furnace coke that is not guaranteed running under 1 per cent. in sulphur, and as a consequence it has been paying from \$1.50 to \$1.55 per ton at oven for all the coke it has bought. Some large inquiries are in the market for foundry coke, but they are slow in being closed. The Westinghouse Electric & Mfg. Company has inquiries out for about 5000 tons of foundry coke, shipments July 1 to April 1, for its East Pittsburgh, Allegheny and Cleveland, Ohio, foundries. We note a sale of 800 tons of standard foundry coke for delivery over July and August at \$2.15 per net ton at oven to the consumer, and another sale of 1200 tons for delivery over remainder of the year at the same price. The output of coke last week in the Upper and Lower Connellsville regions was 273,422 tons, an increase over the previous week of nearly 2500 tons. It is believed that the worst of the depression in the coke

trade is over. We quote best grades of furnace coke for prompt shipment at \$1.45 to \$1.50; for July and August, \$1.55 to \$1.60, and for last half of the year, \$1.60 to \$1.65, all per net ton at oven. We quote standard makes of 72-hour foundry coke for spot shipment at \$1.85 to \$2 and for last half of the year at prices ranging from \$2.10 up to \$2.40 per net ton at oven. Some grades of furnace and foundry coke lower in quality than the above are offered at lower prices.

### Cleveland

CLEVELAND, OHIO, July 4, 1911.

**Iron Ore.**—The market continues lifeless. Furnacemen who will need some additional ore to make their supply sufficient to the opening of navigation next year are in no hurry to buy, as they expect to be able to get all the ore they want by coming into the market quite late in the season. Few buyers who will need a small tonnage have as yet placed contracts for their requirements. Ore stocks in furnace yards are still generally quite large and many consumers will be able to get along without any additional tonnage, unless the demand for pig iron improves very materially during the next few weeks. More vessels were placed in commission this week, but the condition of the lake trade is still quite unsatisfactory. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

**Pig Iron.**—The market shows more life than for several months. Inquiries for foundry grades have become quite active during the past few days and a moderate buying movement is expected from foundries in this territory. These inquiries are mostly for lots of 500 to 600 tons and under for the last half delivery, although some are for the third quarter only. The demand is for both Northern and Southern grades. Local furnaces have submitted bids on an inquiry from the United Steel Company, Canton, Ohio, for 6000 tons of basic for delivery, 1000 tons a month, during the last half. A heating boiler manufacturer in Canton has purchased 400 tons of Northern and 500 tons of Southern iron for the last half, and the sale of two other 600-ton lots of Southern iron for the same delivery are noted. The Southern sales were made on the basis of \$10.25, Birmingham, for the last half. A Cleveland foundry is in the market for 1500 tons of No. 1 Southern for the last half. An inquiry from a Lansing, Mich., automobile manufacturer is for 2500 tons of Northern and Southern analysis iron for the last half, and a Michigan implement manufacturer wants 1000 tons of Southern for the same delivery. While prices on foundry grades are unchanged at \$13.50 to \$13.75 Valley furnace, for No. 2 some producers are adhering to a \$14 quotation. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 2	14.25
Gray forge	13.25
Southern foundry, No. 2	\$14.35 to 14.85
Jackson Co. silvery, 8 per cent. silicon	17.50 to 17.75

**Coke.**—The demand for foundry grades has become quite active. Many consumers who had contracts that expired July 1 waited until these contracts were on the verge of expiring before coming into the market. This resulted in the placing of considerable tonnage for the last half in the past few days. Furnace coke is quiet. We quote standard Connellsville furnace coke at \$1.45 to \$1.50, per net ton at oven for spot shipment, and \$1.60 to \$1.70 for the last half. Connellsville 72-hr. foundry coke is held at \$1.85 to \$2.15 for spot shipment and \$2.15 to \$2.40 for the remainder of the year.

**Finished Iron and Steel.**—Reports from sellers are all very encouraging. Prices on steel bars have become firmer and some buyers who have been holding off in the hope of getting concessions are closing contracts on the 1.25c. basis. The demand for plates has improved and that for structural material is quite active. Contracts for a considerable tonnage of plates and structural shapes for delivery until January 1 have been placed the past few days by structural shops, which, in this territory, are now comfortably filled with work. While the leading producers are maintaining plate prices some of the smaller mills making the narrow sizes are continuing their former policy of selling at \$1 a ton below the regular market price. Current orders and specifications on steel bar, plate and shape contracts are fairly good. While they are generally for small lots they average a larger tonnage than for

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some time. In structural lines considerable new work is being figured, but no new contracts of any size are reported. The demand for sheets is only moderate, although quite a few contracts are being placed for the last half. Several of the mills are taking contracts at the regular price, but with their mill instead of Pittsburgh as the basic point, which amounts to a maximum price concession of \$1 a ton in this territory. There is a fair demand for shafting, but prices are weak, regular quotations being shaded considerably. The demand is moderate for forging billets in car lots, on which regular prices are maintained. The demand for iron bars is light. Prices are unchanged at 1.25c. to 1.30c. at mill.

**Old Material.**—The market has improved slightly and has a firmer tone than for some time. Two local consumers are in the market for steel making scrap for future delivery, and one of them has contracted for considerable tonnage in the week. Local mills are paying about \$11.75 for heavy steel, which is an advance of about 50 cents a ton over what they have been paying recently. Some small lots on cars that dealers were anxious to move went at about \$11.50. While sellers do not look for much demand the next few weeks they expect more activity at the end of the month and firmer prices. The railroad lists this week include indefinite tonnages offered by the Erie Railroad, to close July 5, and by the Pennsylvania Lines West, to close July 6. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.50 to 12.00
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	10.75 to 11.00
Railroad malleable.....	11.00 to 11.50
Light bundled sheet scrap.....	8.00 to 8.50
The following prices are per net ton, f.o.b. Cleveland:	
Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.25 to 6.50
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate.....	9.50 to 10.00
Bundled tin scrap.....	11.00 to 11.50

### Cincinnati

CINCINNATI, OHIO, July 3, 1911.

**Coke.**—There is no activity in this territory in furnace coke, although the Eastern inquiries reported last week are still open. Some foundry contracting is going on, and there is considerable foundry coke business yet to be placed, although the majority of foundrymen have covered for a last half supply. Prices remain the same as previously quoted, but foundry coke shows more firmness in all three fields, and is quotable, for prompt shipment, around \$2 to \$2.15, with the future contract price on several brands running as high as \$2.35 per net ton at oven. Furnace coke remains weak at \$1.40 to \$1.55 for prompt shipment, but extended delivery contracts call for an advance of about 15c. per ton over the last-named figure.

**Finished Material.**—One bright spot in the general business situation is the demand for a number of finished material products, notably among which is the relatively heavy buying of steel bars and sheets. Specifications have been coming in at a moderately satisfactory rate, and both local warehouse and mill agencies report a steady improvement. Warehouse prices remain at 1.70c. per lb. on steel bars and at 1.80c. for structural material.

**Pig Iron.**—The first part of July is usually a dull period and the present week opens up with no exception to the general rule, although the inquiry is remarkably good as compared with last month at this time. Consumers who have not covered for their entire last half requirements seem disposed to take hold now, and a number are asking for deliveries extending into the second quarter of next year. So far no reasonable prices have been made for any shipment beyond December of this year. From Michigan there is an inquiry for 1500 to 2000 tons of foundry iron for a stove maker; the same territory furnishes requests for prices on 1000 tons of foundry and 500 tons of high silicon iron, as well as a miscellaneous lot of small tonnage inquiries, all for last half shipment. Indiana manufacturers are in the market for lots ranging from 100 to 1000-ton lots of foundry iron and two or three of the larger ones are expected to be closed this week. Sales

include 1000 tons to a local melter, divided equally between Northern and Southern foundry. An Indiana firm bought 1000 tons of Northern No. 2 foundry at \$13, Ironton, for last half shipment. A lot of Southern No. 3 foundry, for the same shipment, went to a Michigan concern at \$9.75, Birmingham. For the remainder of the year \$10 Birmingham and \$13 Ironton on No. 2 foundry are easily obtainable quotations, but it is rumored that the furnace interests expect an advance, and are not now making any great effort to fill up orderbooks at these figures. Malleable continues quiet, although there are a few inquiries out. It is quotable around \$13.25 to \$13.50 Ironton. Although there are reported to be comparatively large stocks of Jackson County silvery iron being held, it remains firm at \$16 furnace, based on 8 per cent. silicon. Interest in basic is not very much in the foreground, but it is quite possible that more than one concern has been doing some quiet figuring for a future supply. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$13.75 to \$14.25
Southern coke, No. 2 foundry and 2 soft.....	13.25 to 13.75
Southern coke, No. 3 foundry.....	13.00 to 13.25
Southern coke, No. 4 foundry.....	12.50 to 12.75
Southern gray forge.....	12.00 to 12.50
Ohio silvery, 8 per cent. silicon.....	16.95 to 17.20
Lake Superior coke, No. 1.....	14.70 to 14.95
Lake Superior coke, No. 2.....	14.20 to 14.45
Lake Superior coke, No. 3.....	13.70 to 13.95
Basic, Northern.....	14.45 to 14.70
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	19.00

**Old Material.**—It is said that the 30,000 tons of steel scrap that a Western railroad system has been holding for several months is still on the market. The buyers are not disposed to meet sellers' views, and this fairly represents the situation in this territory, both as to the larger and smaller dealers and sellers. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Casting borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.00
Burnt scrap, net ton.....	6.50 to 7.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

### Chicago

CHICAGO, July 3, 1911.

Except as it may be somewhat retarded by the mid-summer season the market situation in iron and steel continues to show favorable progress. Both because a year of dullness has permitted keeping mills in good repair and because of the improved volume of orders on the books the shutdowns usual at this time are to be shorter than might have been expected. The local mills of the United States Steel Corporation at South Chicago and Gary and the Indiana Harbor plant of the Inland Steel Company were closed on Monday and Tuesday only. The East Chicago bar mills are off for this week only. The steel bar situation appears to have been well cleared up with the closing of its contracts by the large implement interest at Moline. The signing of last year's wage scale by the Republic Iron & Steel Company may be taken to indicate that it now has its bar tonnage practically placed. Structural and plate tonnage continues satisfactory and a volume of rail business is considered imminent. Structural contracts aggregating 3500 tons are reported for the week. The pig iron market has changed little during the week, but it is understood a round tonnage of Southern iron for delivery in the last half was placed, the price being on the basis of \$10 Birmingham for No. 2.

**Pig Iron.**—Melters of iron in this market are inquiring very generally for iron to be delivered in the last half and in one or two instances over into the first quarter. The volume of inquiry is still rather out of proportion to the orders placed, but the aggregate tonnage of the week, particularly of Southern iron, was very good. A large Milwaukee melter has been in the market for 2000 tons, and it is understood that the iron will be furnished by the Bay View furnaces. A Laporte, Ind., implement manufacturer bought 1000 tons of Southern iron at \$10, Birmingham, for last half delivery and is in the market for the remainder of a 2000-ton inquiry. Inquiry for malleable iron has been prominent, but it is reported that only a few thousand tons



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have been bought. Indications are that prices now prevailing are so low as to tempt buyers who at the same time hesitate to buy beyond their immediate needs in the belief that prices will remain as they are for some time to come. We continue to quote for Chicago delivery, with the exception of local irons, which are f.o.b. furnace, the following prices:

Lake Superior charcoal.....	\$16.50 to \$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	14.85 to 15.10
Southern coke, No. 2 foundry and No. 2 soft.....	14.35 to 14.60
Southern coke, No. 3.....	14.10 to 14.35
Southern coke, No. 4.....	13.85 to 14.10
Southern gray forge.....	13.60 to 13.85
Southern mottled.....	13.60 to 13.85
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery, 6 per cent.....	17.90
Jackson Co. and Kentucky silvery, 8 per cent.....	18.90
Jackson Co. and Kentucky silvery, 10 per cent.....	19.90

**Rails and Track Supplies.**—The week past has not been important in the placing of rail orders. It is stated, however, that a very satisfactory volume of business is pending. In bridge and car work the railroads continue to be interesting factors. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c., Chicago.

**Structural Material.**—The more important lettings of building structural contracts during the week were the Federal Life Insurance Building, this city, for which 1368 tons will be furnished by the Worden-Allen Company, and 1065 tons for a reinforced concrete building for the Corn Products Refining Company, Argo, Ill. The American Bridge Company will fabricate 194 tons for a court house at Danville, Ill.; 140 tons for the Cox Ferry bridge, California; 191 tons for subway construction for the Elgin, Joliet & Eastern Railway, and 129 tons for the Wolvin Building, Duluth. The Illinois Steel Company will roll 3000 tons of car building structural shapes for the Mexican Northwestern Railway. We quote plain material from mill at 1.53c. and from jobbers' stocks, 1.75c., Chicago.

**Plates.**—Plates for car building and bridge work, augmented by a growing volume of tank plate orders, have accumulated into very satisfactory rolling schedules for the local mills. Chicago quotations for mill shipment are 1.53c.; from store, 1.75c.

**Sheets.**—While for a long time the sheet business has been so sparse as to make the mill rollings very unsatisfactory it is now believed that sufficient business is in sight to greatly improve this situation. Mills are beginning to be restless under the low prices. Jobbers, while carrying sufficient stocks to protect themselves, are not yet buying for the future. Some slight irregularities in price are noted, but nothing of marked significance is reported. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

**Bars.**—With the closing of its bar contracts by the leading manufacturer at Moline, it becomes apparent that the Republic Iron & Steel Company has contracts covering probably 90 per cent. of its available tonnage. Steel bar prices are not decidedly strong, although generally well maintained. The impression prevails with reference to bar iron, in view of the tonnage recently placed, that a firmer attitude on the part of the mills is imminent. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

**Wire Products.**—The dull midsummer market has developed little out of the routine in the wire trade during the week. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.78c.; painted barb wire, 1.78c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

**Cast Iron Pipe.**—The contract for 2000 tons of pipe for Hammond, Ind., will be placed with the United States Cast Iron Pipe & Foundry Company, as was the Columbus, Ohio, lot of about 1000 tons also. At Mandan, N. D., 500 tons was awarded to a Fargo contractor, the order for the pipe not having been placed with a

manufacturer as yet. At Detroit 11,000 tons will be awarded July 11. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

**Old Materials.**—From the standpoint of the scrap market the week has been very quiet. The local mills have sought to take as little as possible owing to the light operations of the current week. Railroad offerings were very light. We quote below for delivery to buyers' works, all freight and transfer charges paid, per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	12.25 to 12.50
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, subject to inspection.....	24.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
Shoveling steel.....	9.75 to 10.25
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	13.75 to 14.25
Steel angle bars.....	10.25 to 10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.25
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	9.00 to 9.50
Locomotive tires, smooth.....	16.00 to 16.50
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.25 to 10.75
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	10.00 to 10.50
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

### Philadelphia

PHILADELPHIA, July 3, 1911.

The usual midsummer idleness of finishing mills is expected to be of short duration. In fact, the trade generally looks forward to even more active conditions in the latter half of July. The pig iron movement has been on a fairly even basis, with prices practically unchanged. Structural material continues the most active of the finished material lines, but contracts close slowly. Old material is sentimentally stronger, but business drags. Both furnace and foundry coke still show considerable activity.

**Iron Ore.**—While negotiations are pending for at least one large block of foreign ore no sales of importance are reported. Importations at this port in the week ending July 1 include 7579 tons of Swedish and 6100 tons of Cuban ore.

**Ferromanganese.**—No fresh demand has developed in this territory. Quotations remain unchanged at \$36.50, Baltimore, for 80 per cent.

**Billets.**—Buying has been on a fairly even basis, but orders are still confined to small lots for near future delivery. Forging steel continues in better demand than rolling steel. Prices are well maintained at \$23.40 for rolling billets, and \$28.40 for forging billets, delivered in buyers' yards in this vicinity.

**Plates.**—Orders during the week are reported by Eastern producers to have been fully up to the preceding few weeks. Quantities also show an increase, in several instances lots of several hundred tons being placed. Bridge plates have been in active demand and several fair orders for tank, boiler and ship plates are noted. While immediate business is lighter, due to the holiday, more activity is looked for in the immediate future. Quotations are firm at 1.50c. for ordinary plates, delivered in this district.

**Pig Iron.**—There has been a moderate inquiry for foundry grades but quantities openly before the trade are usually confined to small and moderate lots. Interest on the part of consumers, however, is somewhat broader and buying for more extended delivery would, no doubt, result if producers were generally willing to sell ahead at to-day's quotations. For delivery in this immediate vicinity producers of standard brands of No. 2 X foundry adhere pretty firmly to \$15 minimum, although, in sharp competition with furnaces in other producing districts, prices which represent a slightly lower figure for delivery here have no doubt been made. In such cases the matter of freight rates dominates the situation. Orders placed during the week have been slightly larger in the aggregate. The Pennsylvania Railroad Company has placed orders for a good part of the foundry iron recently inquired for, and more substantial orders, running up to several

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hundred tons, as well as a good number of small orders have been received from the general trade. The cast iron pipe foundries are still in the market for low grade iron, for third quarter and more extended delivery. There has been little movement in Virginia foundry grades, small lots constitute the bulk of the sales in this territory, with prices unchanged. Small sales of Southern foundry iron are reported at \$10.50, Birmingham, base for No. 2. Business in this grade has not been sufficiently interesting to producers to bring out the minimum quotation. While some business has been done in forge iron there is no general interest shown by consumers and that grade shows little activity. Although \$14.50, delivered, is considered about the market, that price could no doubt be shaded if a desirable quantity was inquired for. There has been little doing in the steel making grades; several inquiries for basic are still before the trade, while small sales of low phosphorus iron, together with an occasional moderate lot, are reported. The following range of prices is named for standard brands, delivered in buyers' yards, in this district during the third quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.00 to \$15.25
Eastern Pennsylvania No. 2 plain.....	14.75 to 15.00
Virginia foundry .....	15.05 to 15.50
Gray forge .....	14.50
Basic .....	14.50 to 14.75
Standard low phosphorus .....	20.50 to 20.75

**Old Material.**—Although the actual amount of business transacted has not been large, the market has a somewhat better tone. Heavy melting steel is still rather inactive, although some business between brokers to fill expiring contracts has been done around \$13. Borings and turnings have been a trifle more active and prices are slightly better. Wrought iron scrap is in better demand and some sales of yard wrought are reported. Car wheels have also been sold in moderate quantities. The month's offerings from the railroads have not come out, but will no doubt command the attention of the trade before the week end. A lot of 1000 tons of Panama scrap, which will come to this port, is offered by the Panama Railroad, bids on which will be received July 10. The following quotations, while largely nominal, represent sellers' ideas for moderate lots for prompt delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling (nominal).....	13.75 to 14.25
Low phosphorus heavy melting steel scrap..	16.75 to 17.25
Old steel axles (nominal).....	19.25 to 19.75
Old iron axles .....	24.00 to 24.50
Old iron rails .....	16.50 to 17.00
Old car wheels .....	13.00 to 13.50
No. 1 railroad wrought .....	15.00 to 15.50
Wrought iron pipe .....	12.00 to 12.50
No. 1 forge fire .....	10.50 to 11.00
No. 2 light iron (nominal).....	6.75 to 7.25
Wrought turnings .....	8.79 to 9.25
Cast borings .....	8.25 to 8.75
Machinery cast .....	13.00 to 13.50
Railroad malleable .....	11.50 to 12.00
Grate bars, railroad .....	10.00 to 10.50
Stove plate .....	9.75 to 10.25

**Coke.**—Considerable business in both furnace and foundry coke is under negotiation. At least one large block of furnace coke for last half delivery has been closed, while several 1000-ton lots of foundry coke have been contracted for. A fair volume of business in prompt coke is also reported. Quotations are unchanged, the following range being named per net ton for delivery in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.65 to \$4.00
Foundry coke .....	4.10 to 4.55
Mountain furnace coke.....	3.25 to 3.60
Foundry coke .....	3.70 to 4.15

**Structural Material.**—Projects under consideration close, as a rule, rather slowly, although there is quite a good volume of business under negotiation. Smaller fabricators still contend that they are unable to meet quotations named by the larger fabricators and that a large share of the business therefore goes to the latter interests. The several hotel projects in this district are still unclosed. More bridge work is pending and the trade looks forward to continued active conditions. Prices are maintained at 1.50c. minimum for plain shapes, delivered in this territory.

**Sheets.**—While mills are closed for the usual mid-summer repairs, orders are reported as coming in quite freely, for the greater part in small lots, and mills expect to have order books in pretty good shape when operations are resumed. In several instances mills will resume partial operations next week. Quotations are unchanged, the following range of prices being named f.o.b. Eastern maker's mill: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 to 26, 2.50c.; No 27, 2.60c.; No. 28, 2.80c.

**Bars.**—A moderate volume of business is being placed, but the market lacks snap. Refined iron bars come out in odd lots, for which prices are unchanged at 1.27½c. to 1.32½c., delivered, but are not considered particularly strong. A fair business in steel bars at 1.40c., delivered, is reported, with specifications on contracts coming in fairly satisfactory.

### St. Louis

St. Louis, Mo., July 3, 1911.

The general situation continues to develop improved characteristics. Reports of inquiries as well as of specifications on contracts justify the better feeling. The demand is keeping well up on ordinary business and in some instances anticipation of contract requirements is reported on both pig iron and coke. About the only weak spot noticeable is in the requirements for the agricultural machinery plants which are waiting, seemingly, upon the crop reports as affected by the drought situation.

**Pig Iron.**—The interesting feature of the pig iron market the past week was the appearance of the Missouri Malleable Iron Company in the field with an inquiry for 2000 tons of malleable for car castings, etc. Some confusion resulted because the same inquiry was sent out by the company for which the castings are to be made, and the impression gained ground that the sale, when finally made, was for double the actual amount. The taking was, however, 2000 tons at the last quotation. Aside from this one order for 750 tons and other small ones aggregating about 250 tons more constituted the total of new business for the week. On contracts the specifications generally are keeping up well and in a few cases are even anticipating requirements. An inquiry for 500 tons of Virginia high manganese appeared in the market late in the week and a deal for closing is well under way at this writing. Quotations for No. 2 Birmingham may be regarded as at \$10 to \$10.25, the latter figure being held firm for exclusively last quarter delivery. In Northern No. 2 there has been nothing of consequence doing and no change from last figures, nor has there been anything new in basic. Generally, however, the situation is regarded as better than for some time, the market clean and prices not so indifferently held as recently. If there is any shading now it is in analysis iron better than No. 2 at the No. 2 price.

**Coke.**—Inquiries are increasing in coke and although prices are unchanged the situation is regarded as firmer. Requisitions on contracts are kept up with some in anticipation of the standing orders. Inquiries for last half delivery and also for delivery to July of next year are increasing in number. The quotations remain unchanged from the figures last given, \$2 to \$2.25 at oven for best 72-hr. selected, Connellsville or Stonega. As far as can be learned very few consumers are behind their contracts in requisitions, indicating that they are keeping up well in their business.

**Finished Iron and Steel.**—In the finished material market there is a generally better feeling with expectations of early increases in the movement. In structural material the orders have been very good, most of the tonnage being on special work, but buyers are also ordering small tonnage for stock, the price being on the basis of \$1.35 Pittsburgh and firm. No jobs of any size came out during the past week, the movement generally being on existing work and its requirements. Shipments were asked for promptly, and the mills have proved able to meet the requests. In bars the specifications were fair, although buyers, for the most part, are content to wait rather than contract on the present basis. Iron is still so low that most of the tonnage is going in that direction to the exclusion of steel. In standard rails an inquiry is made by a Kansas City road for 700 tons. A Kansas road is looking for about 900 tons, while an Arkansas road closed for 500 tons for September delivery. In track fastenings business has been fair, the railroads requisitioning general materials rather freely. In light rails an improvement in the inquiry from the coal mines is noted, but the lumber companies are doing practically nothing. Agricultural and wagon requirements are apparently held down by some of the crop stories afloat until better determination is to be had as to country needs. Considerable indirect interest in railroad needs has been aroused by the placing by the Missouri Pacific with the American Locomotive Company of an order for 50 freight locomotives of the Mikado type, delivery to commence within 50 days, and orders from the Frisco for 28 Pacific type passenger locomotives and 51 steel passenger cars.

**Old Material.**—In scrap the situation shows a distinctly better tone. Dealers are buying at the present



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prices rather than selling and are holding for the advances and the more active demand that is expected by September 1 if not sooner. During the past week the Missouri Pacific list came out with about 400 tons, the Frisco with 450 tons and the Wabash with 600 tons. While the situation is a bit speculative, nevertheless it is on a rather safe foundation. The better tone to the market for new material is very largely responsible for the improved condition in scrap, though the dealers believe that consumers will have to make their appearance soon in order to care for the natural developments of fall business. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, re-rolling.....	11.25 to 11.75
Old steel rails, less than 3 feet.....	10.25 to 10.75
Relaying rails, standard section subject to inspection.....	23.00 to 23.50
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards cut apart.....	10.25 to 10.75

The following quotations are per net ton

Iron fish plates.....	11.00 to 11.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	14.50 to 15.00
No. 1 dealers' forge.....	8.50 to 9.00
Mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.00 to 9.50
No. 1 boilers, cut to sheets and rings.....	8.00 to 8.50
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.25 to 7.75
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

### Buffalo

BUFFALO, N. Y., July 3, 1911.

**Pig Iron.**—Interest in pig iron is steadily broadening and an increasing number of inquiries are coming in from users of foundry grades—pipe and radiator works, manufacturers of railroad and general machinery lines—and more iron was sold in this district last week than in any like period for six weeks. Consumers are interested principally in last quarter and first half of next year, but furnacemen are disinclined to consider deliveries very far into first half and some are refusing to take any first half business at present prices. Orders include a large tonnage of high silicon iron from a Troy manufacturer for shipment over the fourth quarter and running into the first quarter of next year; one of 2000 tons foundry grades for fourth quarter, and several of 600 to 1000 tons, aggregating 7000 to 8000 tons besides the large tonnage order mentioned. Some sales were also made in Canada to manufacturers of agricultural implements. Shipments on contracts are going forward rapidly from furnaces and in excess of the rate of production. Prices for current and fourth quarter delivery remain about the same as last week's schedule, but furnaces are becoming more reluctant to apply current prices to extended deliveries and there is a strong tendency toward firmer prices in that direction. We quote as follows for delivery over last half f.o.b. Buffalo:

No. 1 X foundry.....	\$13.75 to \$14.25
No. 2 X foundry.....	13.25 to 14.00
No. 2 plain.....	13.25 to 13.75
No. 3 foundry.....	13.00 to 13.25
Gray forge.....	13.00 to 13.25
Malleable.....	13.75 to 14.25
Basic.....	14.00 to 14.75
Charcoal.....	16.50 to 17.25

**Finished Iron and Steel.**—Inquiries and orders in finished lines continue to show improvement in volume. In bars and plates particularly considerable contracting has been completed for third and fourth quarter delivery. The leading interest reports a number of good contracts closed in the week for material required by agricultural implement and other manufacturing interests. Good inquiries are received for concrete reinforcing bars, and the Canadian export trade continues to show active demand in all lines. Sustained activity is noted in fabricated structural material and a large amount of business is in sight for the summer and fall months. Figures are soon to be taken for a 14-story office building for the Eastman Kodak Company, Rochester, N. Y., involving a large tonnage of steel, bids to be closed the latter part of the month. Cornell University is receiving bids to July 15 for steel required in the erection of three additional buildings at Ithaca requiring about 500 tons and bids are to be received this week for steel for the Hamot Hospital Nurses' Home, Erie, Pa.,

about 250 tons. The Lackawanna Bridge Company, Buffalo, has been awarded the contract for the fabrication and erection of steel for the Seitz Building, Syracuse, N. Y., 200 tons. The Charles E. Ernst Iron Works, Buffalo, was the lowest on bids opened this week for the 800 tons steel for the Hutchinson High School, Buffalo, but the contract has not yet been awarded.

**Old Material.**—The betterment in the demand for scrap continues. Very little material is coming out at present prices, owing to the fact that dealers are inclined to hold their stocks for a higher market and that only a limited tonnage is being offered by scrap producers. Prices have shown an advance for the week. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel.....	\$12.25 to \$12.75
Low phosphorus steel.....	15.50 to 16.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 1 railroad and machinery cast scrap.....	13.25 to 13.75
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.75 to 13.25
Railroad malleable.....	11.50 to 12.00
Boiler plate.....	10.50 to 11.00
Locomotive grate bars.....	11.00 to 11.50
Pipe.....	9.50 to 9.75
Wrought iron and soft steel turnings.....	7.00 to 7.25
Clean cast borings.....	6.50 to 6.75

### San Francisco

SAN FRANCISCO, June 27, 1911.

The tonnage of sales for June has been augmented by a number of very fair structural contracts, this being about the most active department at present. The total of cast-iron pipe sales has also been very satisfactory. While in other lines little or no improvement is noted, the aggregate has been at least up to the average of recent months, and general indications seem more encouraging. Outside of the building trades the principal buying is for public utilities and development projects, and requirements in this line are likely to be quite large for the remainder of the season. The demand from established consuming industries is limited.

**Bars.**—Little change is noted in the market for soft steel bars, the demand in the distributive trade being held down very closely to immediate requirements. The only business of much consequence is on reinforcing material, which is now in fairly active demand. The city of Los Angeles received bids last week for 72,000 round bars for reinforcement. Bars from store, San Francisco, are quoted at 2c. for steel and 1.90c. for iron.

**Structural Material.**—The American Bridge Company has taken an order for 300 tons for the Pacific Portland Cement Company's plant, near Suisun, Cal., and a contract for about 250 tons for Gladding, McBean & Co.'s large clay shed at Lincoln, Cal., has been let to the McClintic-Marshall Construction Company. The Palm Iron Works, Sacramento, Cal., has taken the D. O. Mills bank contract in that city, 200 tons. Figures are being taken on the general contract for a hotel there, which is expected to take about 600 tons. The principal local jobs are the Bankers' Investment Company's building, Market street, about 700 tons, and the San Francisco Investment Company's building at Sutter and Montgomery streets, about 300 tons, both of which have been taken by the Pacific Rolling Mill Company. This company also has the contract for Pantage's Theater, 300 tons. The Ralston Iron Works has taken a small job for the Welch estate building, and Dyer Bros. are the low bidders on cells for the county jail, about a \$50,000 job. The Masonic Temple in this city is still pending. Figures are to be taken shortly for a five-story steel frame warehouse at Sacramento, Cal., and bids have been taken on a small municipal job at Fresno, Cal. The Masonic organizations at Seattle, Wash., are considering plans for a large temple. The Liberty Coal & Ice Company, Portland, Ore., is planning to erect a steel coal shed. Bids will be opened July 27 for a new building for the Idaho State capitol. An inquiry is expected shortly for a heavy tonnage for the naval station at Pearl Harbor, T. H. The Knights of Columbus building in San Francisco is again up for figures.

**Rails.**—Orders are coming in freely from small roads all over the coast. Aside from several proposed lines, on which business may be closed at any time, extensions to existing street and interurban roads are taking a considerable tonnage. Light rails are still rather quiet. The Northern Electric Railway is planning extensions from Marysville to Colusa and from

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Sacramento to Woodland, Cal., on which work will probably be started this year, and plans for next year include a line from Chico to Red Bluff, Cal. There is apparently some likelihood of the construction of a road connecting Lakeport, Cal., with lines in the Sacramento Valley. Gladding, McBean & Co. have about completed arrangements for a tramway between their plant and clay beds at Lincoln, Cal.

**Sheets.**—The recent revision of prices has caused no distinct change in local market conditions. After a temporary interruption distributive business has been resumed on about the former scale, but there is no real activity. There are indications of a good consuming demand, however, and a heavier movement is expected within the next month.

**Plates.**—A fair tonnage has been booked, and while new inquiries of importance are slow to materialize an increasing demand is expected later in the summer. There is little steel-tank work in the oil fields at present, but a large tonnage will be required for refineries and distributing plants at other points. It is reported that the Copper River Railroad in Alaska will erect tanks with a capacity of 150,000 bbl. In addition to its improvements in California, the Standard Oil Company is planning large storage stations on Puget Sound and in the Hawaiian Islands. The California-Fresno Oil Company will rebuild its refinery recently destroyed by fire at Fresno, Cal. The Great Western Power Company is preparing improvements to its hydro-electric plants in northern California, which will require considerable penstock work.

**Merchant Pipe.**—The demand for casing and oil pipe, while perhaps better than a few months ago, is still quiet, and merchants report continued dullness in the small trade. Some business is coming from water and gas companies, however, the largest recent order being for 65,000 ft. of 12-in. pipe, placed by the Western Water Company, Bakersfield, Cal., with a Los Angeles merchant. The Bard Oil & Asphalt Company has let a contract for an 8-mile line of 4-in. pipe near Santa Paula, Cal. The Santa Maria, Cal., Gas Company is preparing to extend its system to a number of nearby towns. The city of Los Angeles has just received bids for 1000 ft. of 8-in. casing and 723 ft. of 24-in. pipe. A better oil field business is expected in the fall, but the outlook is very uncertain.

**Cast-Iron Pipe.**—The June tonnage in this territory has been very satisfactory, including 8000 tons for the city of San Diego, taken by the United States Pipe Company. Deliveries are to be completed on this order by the end of the year. The city of San Francisco is about ready for delivery of the last of the pipe for the high-pressure system. The town of San Mateo, Cal., has just received figures on a complete water system. The Union Water Company of Oakland, Cal., is still holding off, and there is apparently some uncertainty regarding its future course. The Pacific Gas & Electric Company is in the market for a very large tonnage of gas pipe, for delivery to Sacramento, Stockton, Chico, Marysville and numerous other points, and the San Francisco Gas & Electric has ordered about 700 tons. The city of Los Angeles has ordered 420 tons of 30-in. pipe, and is in the market for 450 tons more. A large order for high-pressure water pipe is also expected shortly from Los Angeles harbor. The town of Santa Barbara, Cal., is taking bids on a small lot, and the Santa Barbara Gas & Electric Company is planning a 6-mile extension of its mains. The Spring Valley Water Company has acquired a 22-mile right of way from Niles, Cal., to Oakland, but it is unlikely that any pipe will be laid in the near future. It is reported that the Sisquoc Investment Company, Santa Barbara, Cal., will lay a lot of large cast-iron pipe for irrigation purposes.

**Pig Iron.**—The first arrival of foreign iron in several weeks was a shipment of 650 tons for Girvin & Eyre, of this city. Supplies, however, have been ample for all current needs, and it is difficult to sell except in very small lots. No. 2 Southern foundry iron is nominally valued at about \$20.50, but finds little demand in this market.

**Old Material.**—Some business in rerolling rails was booked about the middle of the month, the principal sale being 4000 tons purchased by the Rudgear-Merle Company from the San Francisco Iron & Metal Company. The Rudgear-Merle rolling mill will probably start in August or September. At present everything on the list is dull, owing partly to the approach of the midsummer inventory. It is almost impossible to sell cast scrap, and accumulations in the hands of dealers are larger than for some time. A better demand for

steel melting scrap is expected in August, as it is believed that stocks held by melters will be about cleaned up by that time, and the new plant at South San Francisco is expected to start up in September. Prices are quoted as follows: Cast-iron scrap, per net ton, \$16; steel melting scrap, per gross ton, \$10.50 to \$11; wrought scrap, per net ton, \$11 to \$15; rerolling rails, per net ton, \$11.

### Birmingham

BIRMINGHAM, ALA., July 2, 1911.

**Pig Iron.**—The sales effected the past week were very scattering and the aggregate of tonnage sold comparatively small. About 1000 tons for shipment during the third quarter was sold by one producer; 500 tons for spot shipment by another; 200 tons of analysis iron for delivery during the last half by another, and 300 tons of gray forge for spot shipment by a fourth. The lot of 200 tons of analysis iron brought a premium of \$1 per ton over the No. 2 foundry schedule, while the lot of 300 tons of forge was sold at \$9.25 Birmingham. With these exceptions the transactions reported involved a basis of \$10, Birmingham, for No. 2 foundry. The market quotation for last half deliveries is understood to be a basis of \$10.50 without any figures whatever having yet been submitted on deliveries further advanced. In the absence of a transaction involving the figures just named, the quotation is of course considered nominal, but it is quite likely that the terms for delivery on a \$10 basis are not now so liberal as could be had one week ago. The inquiry for last half shipments has improved perceptibly; in fact, to such an extent that the theory of a very limited provision by the trade for its second half requirement is more generally accepted. At this time two lots of 2000 tons each for shipment during the last half are pending and the smaller lots are attractive in the aggregate. An increase has been made in the output of basic iron, but without any indications of an addition to the number of stacks being operated on foundry grades. It will be noted that the production of foundry grades on July 1 was even smaller than that of June 1, a total of only 13 stacks being in operation on the first date named. The present condition of furnace stocks cannot be arrived at with accuracy without the necessary stock reports and those figures will probably not be available before July 5. Recent additions have been made to the tonnage on charcoal iron orderbooks and quotations have been fully maintained. We quote the local market for prompt shipments as below per gross ton f.o.b. cars here:

No. 1 foundry and No. 1 soft.....	\$10.50
No. 2 foundry and No. 2 soft.....	10.00
No. 3 foundry .....	9.50
No. 4 foundry.....	9.25
Gray forge .....	9.00
Mottled .....	8.75
Standard basic, chill cast.....	10.25
Off basic .....	9.75
Charcoal car wheel iron .....	22.50

**Cast Iron Pipe.**—The principal order placed in this market the past week was for 700 tons of water pipe for requirement at St. Louis, Mo. A number of smaller lots for maintenance work were placed, however, and the tonnage disposed of in the aggregate was fairly satisfactory. All local plants are now closed down on account of the approaching holiday, but operations will be resumed promptly and the business on orderbooks will warrant a steady output for some months. The prices for this material are probably weaker as a result of the continued dullness in the pig iron market. It is understood that the shading of quotations on round tonnages recently placed was very extensive owing to the figures at which raw material could be had, although the present condition is such that quotations can hardly be revised with accuracy. The figures published are being quoted on such small lots as are being offered and for those lots are being maintained. The result of the proposed increase in production will be watched with considerable interest inasmuch as this particular industry has so far this year been comparatively free of competition from two large factors. We continue to quote water pipe as follows per net ton f.o.b. cars here: 4 to 6-in., \$22; 8 to 12-in., \$21; over 12-in., average, \$20, with \$1 per ton extra for gas pipe.

**Old Material.**—The improvement in the demand for finished steel products has not yet been reflected in this market and the aggregate movement continues very light. The consumption locally will be considerably less for some weeks owing to the suspension of operations at the Alabama City mills, but dealers will in the meantime replenish their stocks when practicable at the prices prevailing. Their most encouraging prospects



## THE IRON AND METAL MARKETS

are for the steel grades, but with the continued scarcity of low grade pig iron it is probable that a stronger demand will be found for light cast and machinery grades. Quotations are all nominal and we continue to quote without revision as follows, per gross ton, f.o.b. cars:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

**Coal and Coke.**—This market is considerably stronger as a result of the increase in active furnace capacity and the indications of an early season for cotton oil mills and compresses. It is noted that the purchases of those concerns have been unusually large this time by reason of the large crops predicted, and for the same reason the railroad companies in this section have provided for their coal requirements more extensively. Dealers in domestic coal are now manifesting interest in prices and some deliveries of such grades have already been arranged. The prices for domestic grades will probably be higher this season than formerly, notwithstanding the general decline in prices for steam coal. Standard 72-hour coke for prompt shipment is weaker, but contract prices are so far unaffected.

### The German Iron Market

BERLIN, June 23, 1911.—Uncertainties regarding several trade combinations still exert a depressing influence, and prices continue to give way slowly, where not rigidly fixed by organizations. On the Düsseldorf Exchange the last fortnightly trading brought out lower prices for certain steel products. Band iron was quoted at 127.50 to 132.50 marks, against the last previous quotation of 130 to 135 marks, and wire rods 122.50 marks, against 130. The heavy break in the latter was of course due to the dissolution of the trade combination. On the other hand, pig iron prices were partly higher, in view of the expectation that the Essen Syndicate would be extended and prolonged. A strong effort has just been made by the band iron and wire rod makers to induce the Steel Works Union to reduce the prices of steel billets, which is now 100 marks the ton. The rod manufacturers asked for a cut of 5 to 7.50 marks, and the band mills for 7.50. The big mixed establishments, however, opposed these reductions, and at a meeting of the union yesterday it was decided to postpone a decision of the matter, in view of the fact that better news has come in from the foreign market. This evidently refers to the more active buying in the American market reported by *The Iron Age* this week.

### The Steel Situation

The union's monthly report on the state of business given out yesterday is comparatively satisfactory, but it must be borne in mind that it covers only the fully syndicated goods—half-rolled material, structural forms and rails. In respect to steel material, the report says that the course of the market remains satisfactory, although it has been unfavorably affected by the dissolution of the wire convention, and the foreign market continues quiet owing to the uncertainties in the American situation.

The Prussian railway authorities have at length placed their orders for heavy rails and other track-building supplies for next year's delivery, but the amount is even less than for the current year. The foreign market for heavy rails is good and is expected to continue so, inasmuch as several large railway projects are under negotiation. In grooved rails sufficient work is on hand, and specifications are coming in satisfactorily. Home orders this year have been considerably greater than last year, and foreign sales are of pretty large volume, though prices have been sharply contested by American and Belgian makers. Light rails for mines continue in good demand, but Belgian works are cutting prices in foreign business.

Trade in structural forms for the September quarter has been very active since the end of May, and calls for delivery on order are brisk, which latter also applies to foreign business. English buying is slower owing to price reductions in the United States, but the demand from some other countries is quite good.

So much for the union's report on the goods in question. Other sections of the market are distinctly growing weaker. The wire trade is completely demoralized by the dissolution of the price convention. As anticipated, prices have dropped heavily. The new quotation for wire nails sent in yesterday was 14.50 marks per metric cwt., as compared with the convention's price of 16.50 to 16.75 marks. The export price is 12 marks f.o.b. seaport.

The band-iron trade also continues in a demoralized condition, with prices still tending lower. In heavy plates there is plenty of work on hand, and both home and foreign buyers are calling for goods rapidly, but one market review complains that the convention prices are being cut in some instances. The export trade remains active, but price concessions must be made in competition with English and Belgian goods. The foreign market for wire rods also continues very active. During the past few months about 35 per cent. of the total product was exported.

### The Essen Pig Iron Syndicate

The outlook for the perfection of the Essen Pig Iron Syndicate is much less hopeful. It is understood that the demand of the Gutehoffnungs Hütte for an increase of its allotment, mentioned last week, has now taken on the character of an ultimatum. Decision was postponed to July 9, but as the time for giving notice of withdrawal from the syndicate lapses at the end of this month it is expected that this great establishment will serve notice of withdrawal next week. In that case the syndicate's existence would terminate at the end of July, unless the Gutehoffnungs increase of allotment should be granted. The company attributed its attitude to the fact that its producing facilities have been steadily increasing, an explanation that might be put forth by nearly every one of the great works in the West.

Meanwhile the Siegerland furnaces are showing that they are willing to do everything in their power to help the organization to its completion. They have now agreed to take no orders for 1911 delivery prior to July 15, in order to give the syndicate people time to complete the negotiations. No definite action, however, has yet been taken in treating with the Luxemburg-Lorraine furnaces, and everything in that quarter seems to be at a standstill.

The pig iron market continues to show a quiet, waiting tendency, buyings for 1911 delivery being only for supplementary requirements. Calls for delivery of goods on order are of normal volume. The market for old and scrap iron is quiet. The amount of goods offering is relatively heavy, and prices are weak. The demand for home ores is slightly restricted and supplies are accumulating to some extent at the mines.

The exports of iron and steel in May showed a big recovery from the reduced figures for April, the outgo having been about 65,000 tons greater than for that month, and also about 13,500 tons more than for May, 1910. Imports also registered a further gain.

The latest reports from the Belgian market are again unsatisfactory. Prices are still falling, except where fixed by trade combinations, as in the case of steel rails and beams. Pig iron is severely depressed in price and but little business is doing. The latest news from the French market indicates that it still continues to enjoy an exceptional position among the great producing countries. The recent decision of the French mills to withdraw from the arrangement with the German and Belgian organizations respecting half-rolled steel is understood here to have been due to the strong business position in the northern district of France. In Austria prices are falling, and further reductions are looked for.

### New York

NEW YORK, July 5, 1911.

**Pig Iron.**—Transactions have been more numerous. A larger number of orders have been placed for early shipment by small consumers and some buying has been done by the larger interests. A horse-shoe manufacturer has purchased about 30,000 tons of gray forge for delivery running into next year. Other large consumers are making inquiries and are more freely disposed to contract for future delivery. The interests connected with railroads are purchasing more freely than they have done for some time. Northern iron at tide-water is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.50; No. 2 plain, \$14.50 to \$15. Southern No. 1 foundry is quoted at \$14.75 to \$15.25; No. 2, \$14.25 to \$14.75.

## THE IRON AND METAL MARKETS

**Cast Iron Pipe.**—The city of New York will open bids for 2000 tons of water pipe to-day. The general demand continues quiet. Carload lots of 6-in. are quoted at \$21 to \$22 per net ton, tidewater.

**Finished Iron and Steel.**—A week of hot weather and a national holiday has not been prolific of much business, and it may be that the continued dullness is not necessarily indicative of present fundamental conditions. One plate mill seems to roll special orders about as soon as received, a fact which, if general, shows slackening in demand. A few specific orders of considerable size have been placed during the week for both sheets and steel bars, and it needs only a greater volume in these lines to substantiate the conclusion that buyers are generally convinced that the bottom price has been reached. None of the spectacular structural contracts has yet been placed, but there is still a fair volume represented in new projects. Supplementing the lists given in late issues of work on which bids have been taken or on which there are inquiries may be added the Glen Onoco bridge for the Central Railroad of New Jersey, amounting to about 550 tons. The building at West Point Military Academy will, it is estimated, require 700 tons. The American Bridge Company is reported to have a 1200-ton contract for the Weil warehouse at Greenwich and Lighthouse streets, New York, and the 1400-ton Rotterdam bridge for the Boston & Maine, and the Phoenix Bridge Company is credited 700 tons for a drawbridge for same railroad. It is probable that the Bethlehem Steel Company will roll the 6000 tons for the Bamberger store, Newark, but the fabricating contract has not yet been let. Quotations are: Plain structural material and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.37½c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

**Old Material.**—The Panama Railroad Company, 24 State street, New York, will receive bids until 12 noon, July 10, on 1000 tons of Panama scrap which will arrive in the meantime and be unloaded on cars at Port Richmond, Philadelphia. The general demand shows a little improvement in transactions in heavy steel melting scrap, but not much is doing in other lines. Cast scrap has been less active, while borings and turnings have been particularly quiet. Holders are stubbornly maintaining prices in the expectation of an early improvement in the demand. Quotations are as follows, per gross ton New York and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Rerolling rails.....	(nominal) 12.00 to 12.25
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turning.....	6.25 to 6.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

### Metal Market

NEW YORK, July 5, 1911.

#### The Week's Prices

		Cents Per Pound for Early Delivery.			
		Copper, New York.		Lead.	
		Electro-lytic.	Tin. New York.	New York.	St. Louis.
June.	Lake.				
29.....	12.87½	12.62½	45.10	4.50	4.35
30.....	12.87½	12.62½	45.00	4.50	4.35
July					
1.....	12.87½	12.62½	.....	4.50	4.35
3.....	12.87½	12.62½	45.00	4.50	4.35
5.....	12.87½	12.62½	45.40	4.50	4.35

Copper continues firm and in good demand. Pig tin is very quiet. Lead is dull. Spelter is somewhat stronger.

**Copper.**—Some fairly good sales of copper have been noted during the week and although the speculative element has been in evidence and has caused some irregularity in prices the market has not receded to any great extent. Consumers who are familiar with the market conditions have been able to buy lake all week at 12.87½c. and electrolytic at 12.62½c. Some sellers have been demanding higher prices while others who offered resale lots were making concessions. The exports of copper during the month of June were very large, amounting approximately to 30,074 tons. There is some difference of opinion as to deliveries into domestic consumption, but it is generally conceded that they

were large. In London this morning the market was rather easier with spot copper selling at £56 13s. 3d. and futures at £57 2s. 6d. Exports of copper for the first three business days of the month amounted to 2010 tons. L. Vogelstein & Co. give the following figures of German consumption of foreign copper for the months January-May, 1911: Imports, 74,313 tons; exports, 3211 tons; consumption, 71,102 tons, as compared with consumption during the same period in 1910 of 66,388 tons. Of this quantity 64,555 tons was imported from the United States.

**Pig Tin.**—Pig tin has been very quiet all week and it is a fortunate thing for the consumer that they are fairly well supplied as spot stocks of tin are decidedly scarce. Figures compiled by C. Mayer, secretary of the New York Metal Exchange, show that deliveries into consumption during the month were quite large, amounting to 2900 tons, while the total deliveries for the first six months of the year showed a decrease of 2100 tons compared with the same period of last year. The total visible supplies on June 30 were 905 tons above that of June 30, 1910, but this country is short on spot stocks. Very little business was done during the week as Monday was made a holiday by many and tin could be bought this morning in New York for about 45.40c. In London this morning the market opened with spot tin at £196 10s. and futures at £190.

**Tin Plates.**—Quotations on foreign tin plates were lowered during the week in keeping with the reduction of pig tin prices in the London market and this morning the price for plates at Swansea, Wales, was 13s. 9d. The demand for domestic tin plates continues fairly active and quotations are unchanged at \$3.94 for 100 lb. coke plates.

**Lead.**—Lead continues decidedly firm, but there is very little demand for the metal. Outside sellers are meeting the price made by the leading interest which is 4.50c. New York and 4.35c. St. Louis.

**Spelter.**—The spelter market has stiffened somewhat but consumers are inquiring for less stocks. This morning the price for spelter in New York was 5.80c. and in St. Louis it was around 5.60c.

**Antimony.**—Antimony is considerably weaker and Hallett's can be purchased for 8.12½c. Chinese and Hungarian grades are down to 7.20c. to 7.25c. and Cookson's is 8.50c. It is apparent that people who bought Hallett's two or three months ago for speculative purposes are now offering their stocks at resale at a decided sacrifice.

**Old Metals.**—Business is quiet, but dealers' selling prices, New York, are unchanged as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	8.00 to 8.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc, scrap.....	4.25 to 4.30

#### Chicago

JULY 3.—The movement of metals this week has been more or less sluggish. Fluctuations in the price of tin, both above and below the current quotation, marked the only activity. We quote Chicago prices as follows: Casting copper, 12.75c.; lake, 13.00c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45½c.; small lots, 42c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.65c. to 5.70c.; Cookson's antimony, 9½c., and other grades, 8½c. to 9c., in small lots; sheet zinc is \$7.50 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10¼c.; yellow brass, 9¼c.; lead pipe, 4¾c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 35c.; block tin pipe, 39c.

#### St. Louis

JULY 3.—In metals, aside from Lake copper, there has been very little change the past week. The tone is distinctly firm and the reports from the Joplin zinc district are of strong prices there. Tin is quotable at 45.35c.; Lake copper at 13.15c., electrolytic copper 13c. and Cookson's antimony 8.85c. The demand is rather moderate. In old material the prices per 100 lb. are: Light brass, \$5; heavy brass and light copper, \$8; heavy copper and copper wire, \$9; zinc, \$3; lead, \$3.25; pewter, \$20; tin foil, \$29; tea lead, \$3.



### Notes on Prices

**Rope.**—Business in rope continues moderate, buyers only providing for immediate or nearby requirements, and the market shows corresponding lack of strength on mixed grades of cordage. The following quotations represent regular prices to the retail trade in the Eastern market for rope, 7/16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½ to 9 cents per pound; second grade manila, 7½ to 8 cents per pound; hardware grade manila, 7 to 7½ cents per pound; pure sisal of the highest grade, 6¼ cents per pound; second grade, 6 cents per pound; rove jute rope, ¼ in. and up, No. 1, 6½ to 7 cents per pound; No. 2, 6 cents per pound.

**Linseed Oil.**—There has been improvement in buying of five and ten barrel lots, but business in carload lots has been quiet. The tone of the market is easy, oil generally being obtainable in various quantities below card prices. In 100-barrel lots the price asked is about 84 cents for raw. It has been learned that manufacturing consumers who have used substitutes for linseed oil are having trouble with customers on this account, and it is thought probable that fewer substitutes will be used next year. No change has been made in card prices, but the following prices, in New York, are general for five-barrel lots:

	Cents.
State, raw.....	87
City, raw.....	88
Oil, in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

**Naval Stores.**—The demand for turpentine is confined to a considerable extent to jobbing lots, as large consumers are expecting lower prices. New York quotations are as follows:

	Cents.
In oil barrels.....	56½
In machine barrels.....	57
Less than 5-bbl. lots, ½ cent advance per gallon.	

Demand for the lower grades of rosins has been fair, although the size of orders have been moderate. On the basis of 280 lb. to the barrel, common to good is quoted at \$6.40 and grade D, \$7.05 in the New York market.

### Personal

E. M. S. Young has resigned as general sales manager of the Allegheny Steel Company, Pittsburgh, Pa. W. Lester Walker, who has been appointed general sales manager of that company and also of the Pittsburgh Metal Products Company, was formerly connected with the Hyde Park Iron & Steel Company, Hyde Park, Pa.; later with the Muskingum Valley Rolling Mill Company, operating sheet mills at Zanesville, Ohio, now owned by the American Rolling Mill Company; then with the American Sheet & Tin Plate Company, and finally became connected with the Pittsburgh Metal Products Company. His headquarters will be at the works at Brackenridge, Pa.

W. B. Simpson, president of A. M. Castle & Co., is making an extended automobile trip, having left Chicago June 28 for San Francisco and southern California, accompanied by C. R. Stephens of the Moline Plow Company and G. O. Gunderson, manager of the Acme Steel Company.

Theodore N. Ely, chief of motive power of the Pennsylvania Railroad, retired from active service June 30 in accordance with the pension rules of the company. He had been with that railroad since 1868, and in March, 1893, was appointed chief of motive power. With his retirement the position of chief of motive power will be abolished and the office of chief mechanical engineer has been established to take its place. A. W. Gibbs, general superintendent of motive power of the Pennsylvania lines east of Pittsburgh, was appointed to fill that position. He has been with the company since 1879.

William F. McKenzie, sales manager of the Upson Nut Company, Cleveland, Ohio, severed his connection with that company July 1 to become vice-president of the Gary Bolt & Screw Company, Gary, Ind., and of the Pittsburgh Screw & Bolt Company, Pittsburgh, Pa. He will reside in Chicago. Mr. McKenzie had been connected with the Upson Nut Company 25 years. A farewell dinner was tendered him June 27 at the Hollenden Hotel, Cleveland, which was attended by about 30 representatives of the bolt and nut and general iron and steel industries in Cleveland and other cities. At this dinner he was presented with a handsome loving cup.

H. G. Prout, vice-president and general manager of the Union Switch & Signal Company, Pittsburgh, has had conferred upon him the degree of doctor of laws by the University of Michigan. He was made a master of arts by Yale in 1902.

F. H. Evans, manufacturer of Crescent expansion bolts, 31 to 35 Hewes street, Brooklyn, N. Y., sailed June 27 for a tour through Finland and Russia. He expects to return late in September.

William H. Grady has resigned his position as superintendent of the Seaboard Coal & Coke Company, Coal City, Ala., and has accepted the position of chief engineer of coal mines of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.

A. H. Diehl, formerly in charge of the blast-furnace gas engines of the Duquesne Works of the Carnegie Steel Company, has become identified with the Allis-Chalmers Company.

The University of Pennsylvania has conferred the degree of doctor of science on W. L. Saunders, president of the Ingersoll-Rand Company.

McClernan & Co., Peoples Gas Building, Chicago, Ill., who formerly represented the Brightman Mfg. Company, Columbus, Ohio, for the sale of shafting, screw stock, etc., are no longer representing that company, and for the present the territory which they covered will be taken care of directly from the general office of the company at Columbus.

W. E. Manning, assistant general manager of sales of the Youngstown Sheet & Tube Company, Youngstown, Ohio, sailed for Europe last week.

W. O. Duntley, president Chicago Pneumatic Tool Company, sailed for Europe June 27 and will visit the company's plants in England, Germany and Russia for the purpose of inspection.

J. C. Manternach, sales manager of the tube department of the Standard Welding Company, Cleveland, Ohio, has been appointed general manager of sales. W. H. Pirrong, sales manager of the rim department, has resigned.

E. A. Wurster, secretary of the Falk Company, Milwaukee, Wis., arrived home a week ago from an extensive trip in Europe.

D. R. Day, formerly general manager of the Union Malleable Iron Company, Moline, Ill., has been made sales manager of the Prescott Malleable Iron Company, Milwaukee, Wis.

The United States Cast Iron Pipe & Foundry Company, 71 Broadway, New York, announces that at a meeting of the directors held June 29 the office of chairman of the board was created, and George B. Hayes, formerly president of the company, was elected thereto. At the same meeting L. R. Lemoine, formerly second vice-president of the company, was elected president; George J. Long was re-elected vice-president; B. F. Houghton was re-elected secretary and treasurer; Charles R. Rauth was re-elected assistant secretary and assistant treasurer; Ralph M. Shaw was re-elected assistant secretary.

A. E. Croft has been appointed general manager for E. G. T. Colles & Co., Chicago. He was with the Featherstone Foundry & Machine Company for eight years and for two years past has been sales manager for the Modern Steel Structural Company.

Frank W. Hall, manager of the Philadelphia office of the Sprague Electric Works, has been appointed manager of hoist sales and after July 15 will be located at the New York office, 527 to 531 West Thirty-fourth street. James A. Clifford, manager of the Baltimore office, has been appointed manager of the Philadelphia office. The Baltimore office will be continued as in the past under Mr. Clifford's direction, but as subsidiary to the Philadelphia office and with Henry S. Patterson in charge.

W. C. Mitchell, who for several years has been general superintendent of the Dominion Iron & Steel Company, Sydney, N. S., has been appointed general superintendent of the Algoma Steel Company, Sault Ste. Marie, Ont.

The Valley Mold & Iron Company, Sharpsville, Pa., manufacturer of ingot molds, states that its June tonnage was the heaviest of any month this year. This is taken to indicate fuller operations in the steel works using its ingot molds.

# The American Society for Testing Materials

Fourteenth Annual Meeting, June 27 to July 1, Atlantic City, N. J.

The first of the nine professional sessions which were to comprise the fourteenth annual meeting of the American Society for Testing Materials opened Tuesday afternoon, June 27, at the Hotel Traymore, Atlantic City, N. J. The work began in the usual energetic style which has characterized the activities of this influential organization, with President Dr. Henry M. Howe in the chair and Secretary Prof. Edgar Marburg at his right. The programme provided for a session to be given over to the consideration of preservative coatings for iron and steel, two sessions on steel, one on cement and concrete, one on bitumens, covering road making materials, and one on testing apparatus and methods.

At the Tuesday afternoon session was presented a report of committee A-3, Walter Wood chairman and Dr. Richard Moldenke secretary, on standard specifications for cast iron and finished castings, giving at this time specifications for locomotive cylinders. At the request of the committee chairman no action was taken. Reports were also made of committees on specifications for hard-drawn copper wire, J. A. Capp chairman, and specifications for clay and cement sewer pipes, Rudolph Hering, chairman.

The tellers of election, Richard L. Humphrey and J. A. Capp, announced the unanimous election as members of the executive committee of: W. A. Bostwick, metallurgical engineer, Carnegie Steel Company, Pittsburgh (re-elected); Robert W. Hunt, Chicago; Dr. Richard Moldenke, Watchung, N. J.; William R. Webster, Philadelphia (re-elected).

The society now has a total membership of 1382, 274 applications having been approved since the last meeting, and the total loss from all causes being 172. Another indication of the high estimate in which the society is held is reflected in the sale of its publications. The total receipts from this source for the year 1908-1909 was about \$875; for the year 1909-1910, \$1,376, and for the past year, \$2,540. For the first time in its history the society is on a sound financial footing. Instead of a deficit of \$2,200 which existed a year ago, there is a cash balance in the treasury of \$6,792, with no outstanding liabilities.

## Ingot Iron

A leading feature of Tuesday night's session was an extended paper by Dr. Allerton S. Cushman, entitled, "The Manufacture of Pure Irons in Open-Hearth Furnaces." A metal which contains 3 per cent. or more of a foreign body such as slag, falls, he said, just that far short of being pure iron, and from a perfectly reasonable standpoint it would appear that after the carbon-iron alloy field has been eliminated, the nearer the metal approaches to the theoretical constitution of that element itself the more it justifies the name of iron. This pure iron made in an open-hearth furnace has become generally known in this country and to a certain extent in Europe as "ingot iron."

The manufacture of pure iron in open-hearth furnaces in its entirety is, he continued, undoubtedly a distinctly new development, in spite of the fact that the process has a great many points in common with the open-hearth production of mild steel. In the case of the iron the oxidizing operation under highly basic conditions is carried forward to an abnormal extent. It is not too much to say that the effort is made to do what has generally been conceded to be bad practice in an open-hearth furnace; that is to say, the metal is deliberately over-burned. This treatment yields a bath of metal and slag heavily charged with gas and in a highly super-oxidized condition. The elimination of the carbon and manganese to such low percentages that they amount to no more than traces makes this super-oxidation a necessary step in the process. Having obtained the desired purity with respect to these elements the bath is given a heroic treatment, whereby a thorough deoxidation takes place, the gas being at the same time satisfactorily eliminated.

In tensile strength it closely approximates high-grade well-rolled charcoal iron, and in elongation and reduction of area it not only equals but in many cases surpasses the finest soft steel. It is a well-known fact that iron is

usually inferior to steel in elongation and reduction of area. Owing to its more steel-like qualities in this respect, therefore, pure open-hearth iron becomes available for deep drawing and stamping purposes where very often ordinary wrought iron is unavailable and steel must usually be employed. After reviewing all the evidence available, both favorable and unfavorable, Dr. Cushman affirmed his belief in pure iron as a valuable article of commerce to be stronger than it ever was before.

In discussion there was considerable sentiment expressed against the suggested disturbance of present-day iron and steel nomenclature and it was brought out that the heroic treatment referred to involved the addition of pig iron to bring about the necessary deoxidation. It was mentioned also that the ingot iron is highly weldable and is used as a solder in connection with the high-temperature flame.

## President's Address

President Howe, in his address which opened the Tuesday evening session, paid a tribute to the late Gustavus C. Henning and the audience rose for a moment as a testimonial to his memory. Dr. Howe discussed at some length the inertia or unwillingness of the average individual to accept a change of condition. The friction met in attempting to bring about a change is in part due to the harm one feels may be done him. Those who are in favor of the efforts are the small number of manufacturers who are attempting to serve the public well, the larger number who are those immediately served and the rest the multitude which are benefited.

The buyer is no longer the seller's prey but his employer. The trend of the change is indicated in the newer relations between employer and employee. He mentioned the active part taken in bringing about present-day changes by John Fritz, Judge Gary, Charles Kirchhoff and others. Universal education is uplifting the world's peoples beyond the Aryan race. He mentioned how one of the difficulties to be overcome in the march of progress is the differences among countries regarding such detail as specifications for rails. He outlined a scheme to bring about a single international specification. The problem he emphasized was not an engineering one but psychological.

## Specifications for Steel Wheels and Axles

Considerable attention was paid at the Wednesday morning session, given over to steel, to the question of specifications for steel wheels. A report of Committee A-1, W. R. Webster chairman, was presented, dealing in part with specifications for forged and rolled solid steel wheels for passenger and freight car service, with specifications for heat-treated carbon-steel axles and shafts and with specifications for steel reinforced bars.

Charles S. Churchill, chief engineer, Norfolk & Western Railway, regarded the specifications for steel passenger car wheels as too liberal with regard to the limits of the chemical composition, the carbon being 0.6 to 0.85. He felt it was likely to be difficult later to narrow the limits. Mr. Stevenson of the committee mentioned that the specifications covered both acid and basic steel and that the committee had been working several years on the subject. He emphasized also that the specifications were the first covering rolled solid steel wheels.

R. W. Hunt, Chicago, thought it was better to have no specification than one of some doubtful basis. The rolled solid steel wheel he regarded as too new for the society to take the step of adoption but that the makers should fight their own battles.

R. W. Mahon, chemist, New York Central lines, West Albany, said that wheels used on the same axle only differed by 0.05 carbon and the question of range in carbon was no special argument against the specification. He said wheels used on the New York Central lines came within the specification. The percentage of carbon is stamped on the wheels, and there is no difficulty in properly mating the wheels. One member said that he was buying wheels under a less elastic specification.

Mr. Hunt regarded it as a unique proposition that the manufacturer was not asking for the relatively wide



limits allowed. Professor Marburg emphasized that as the specifications covered a new line they should be liberal rather than exacting, that the society's Year Book carried specifications which are in particulars not so exacting as some in regular use.

The specifications were referred to Committee A, which is to receive and consider specific objections to the specifications.

It was voted to submit the specifications for steel reinforcement bars to a letter ballot of the society.

With regard to the specifications for heat-treated carbon-steel axles considerable discussion arose over an allowed limit of not over 0.6 per cent. carbon. The consensus of opinion was that the carbon limit was protected by the general requirements of the physical tests demanded. It was explained that the limit was put in as a protection and that what was important was the capability of the steel to meet the physical tests. It was voted also to submit the specifications to a letter ballot of the society.

#### Heat Treatment of Iron and Steel

Dr. Howe presented a report on the heat treatment of iron and steel. It was styled as recommended practice for annealing miscellaneous rolled and forged carbon steel products, no attempt being made to draw up specifications on the subject because no single set of rules could be applied vigorously to such widely varying classes of objects and purposes. The report covered suggestions on annealing to remove existing coarse grain, mentioning, for example, that an exposure of 1 hr. should be long enough for pieces 12 in. thick. The trained eye was regarded as better than the use of the unchecked pyrometer, and emphasis was placed on keeping the surrounding light at the same intensity or always dull so that the eye does not have to accustom itself to changing contrasts.

#### Temperatures for Annealing.

Carbon per cent.	Range of Annealing Temperature deg.
Less than 0.12.....	875 to 925 C. (1607-1697F)
0.12 to 0.29.....	840 to 870 C. (1544-1598F)
0.3 to 0.49.....	815 to 840 C. (1499-1544F)
0.50 and over.....	790 to 815 C. (1454-1499F)

Figures were given, as reproduced in the accompanying table, for the annealing temperatures for different carbon contents. The higher the carbon the slower the cooling should be, it was emphasized, and the slower the cooling the more ductile the metal will be and the lower will be its tensile strength, elastic limit and yield point; the greatest softness and ductility being had at a certain sacrifice of strength.

To give an unusually high combination of ductility with tensile strength and elastic limit, the quenching in oil is recommended and the removal of the metal when the temperature has fallen, say, to 160 deg. C. (320 deg. F.). The annealing should begin within a very few hours of the quenching, and the quenching may be done in water if the carbon content is so low and the shape so simple that there is no danger of the piece cracking or receiving permanent harmful stress. The steel hardened should then be annealed to a temperature suited for giving the properties needed. For very high elastic limit and tensile strength annealing at 500 to 650 deg. C. (932 to 1032 deg. F.) is mentioned; in this case the ductility will be low. For greatest ductility, with good strength and elastic limit, anneal at 725 to 750 deg. C. (1337 to 1382 deg. F.).

To get moderate increase of strength and elastic limit, the cooling from the annealing temperature is hastened until the object is at a dull red, say 650 deg. C. (1207 deg. F.), and then the cooling is slow. The hastening of the cooling may be done by withdrawing the object from the furnace, returning at the proper time.

Prof. Mansfield Merriman regarded the report as covering a method of manufacturing, whereas all other matters the society heretofore has dealt with referred to materials after they are made, but the fact that the committee was appointed at a former time was mentioned as answering the point. It was voted to send a copy of the recommended practice to the members for a letter ballot and to print it in the proceedings and in the Year Book.

#### Heat Treatment of Nickel Steel

A paper by Prof. William Campbell, Columbia University, and H. B. Allen covered a research of a heat treatment of an open-hearth steel of 0.27 per cent. carbon, 3.15 nickel and 0.65 manganese, cold drawn,  $\frac{3}{4}$  in. round. It was found that the refining temperature was complete at 750 deg. C or 75 deg. lower than for ordinary carbon steel.

In the case of bars heated and then cooled in the air it was found that reheating to 700 deg. decreased the elastic limit, which was 66,630 lb. per square inch, against 83,170 lb., the elastic limit of the steel as received. The elongation was very marked, as was to be expected, being 33.5 per cent. against 22 per cent. for the steel as received. Heating to 750 deg. gave the maximum ductility, or 37.5 per cent. elongation. Heating to 1200 deg. gave a yield point of 71,740 lb., but an elongation of 25 per cent., and beyond that point there was a marked falling off in ductility.

For bars cooled in the furnace heating to 610 deg. C. lowered the elastic limit and increased the ductility because heat treatment even below the critical points has marked effects on the properties of material that has been worked cold. As before, heating to 750 deg. gave greater ductility, but the 1200-deg. heat showed little difference, indicating that slow cooling may mask overheating. The yield points for the steel as rolled for cooling from 610 deg., cooling from 750 deg. and for cooling from 1200 deg. were 83,170, 71,650, 61,400 and 51,390 lb. The elongation in 2 in. was for the four cases 27, 32, 39.5 and 35 per cent. respectively.

Bars were quenched in water and the maximum tensile strength was 275,800 lb. per square inch, occurring with the bar heated to 870 deg. C. The tensile strength remained high at 1200 deg. It was noted that the strength of quenched bars was liable to vary.

With bars quenched in oil the tensile strength was high, but somewhat below that of water-quenched bars.

Bars quenched in water were reheated and cooled in air. The original quenching gave a low ductility, elongation 2 per cent. and reduction of area about 8 per cent.; reheating to 200 deg. lowered the strength but increased elongation to 12 per cent. and reduction of area to 54 per cent. Later it was found with oil-quenched bars and reheating to 150 deg. a high tensile strength was maintained and ductility enormously increased.

The structure of the steel showed the same variation of ferrite and pearlite as normal low carbon steel. The conclusions covered the refining temperature of 750 deg. already mentioned and that hardening is complete when the steel is quenched from this temperature, but higher tensile strength is obtained by quenching around 900 deg. C. It was also found that overheating becomes marked above 1200 deg., and tempering bars quenched in water or oil gives very uniform increase in ductility and decreases in strength until at 650 deg. the properties are very nearly those of the original steel, having a slightly lower elastic limit and greater reduction of area.

#### Arrangements for Next Year's Congress

Prof. Marburg mentioned on Wednesday evening the necessity of considering general matters concerning the next annual meeting of the society on account of the International Congress to be held in America in September next year. It was decided to hold the annual meeting at the usual time, but to receive only committee reports, the papers which may be presented to be contributed to the International Congress meeting. It was suggested that in order to make amends to the American members for the lack of proceedings, so to speak, suitable financial arrangements could be made so that the members may get the English edition of the proceedings of the congress, which in the case of the English rendition last year yielded 1000 pages. Members of the American Society also members of the international body will get advance copies of the international meeting. It was also suggested that junior members for a payment of \$2.50 could be given the English international proceedings.

#### Metal Preservative Coatings

Wednesday evening's session was styled the session "On Preservative Coatings" and was occupied in part with the reading of the report of committee D-1 having to do with the findings of the conditions of painted panels and structure of the Havre-de-Grace bridge and in part with a paper by Cloyd M. Chapman, of Westinghouse, Church, Kerr & Co., having to do with the observations of paint behavior on small plates exposed to the weather on the roof of a building in lower New York.

#### Paint Tests on Maritime Building, New York

Mr. Chapman's paper gave a table which showed the comparative degree of protection afforded by different classes or groups of paints. These tests have been continued since last year, and other paints added, until now

over 1000 coatings have been exposed to the weather, spread on approximately 3000 steel plates. The paints reported on last year consisted chiefly of ready-mixed products, sold ready for application, but a considerable number of those which are included in this report, and which had not been exposed long enough to be included last year, were made up in the laboratory, from standard pigments and vehicles, while others were supplied by the makers in the paste form and thinned for use with raw linseed oil and dryer.

He emphasized two points in regard to details of the method of testing. The first is the desirability of pickling the plates in dilute sulphuric acid to remove the mill scale before painting. The other point is the desirability of giving the plate an opportunity to rust at some well-defined point, so as to be able to note the effectiveness of the paint film in preventing the spread of rust from that point. This was accomplished in these tests by deeply scratching the corners of each plate through the paint film with a sharp-pointed tool on the day that the plates were exposed.

The table shows the average percentage ratings of these groups of points after one, two and three years' exposure to the weather. These ratings are based solely upon the amount of visible rust which had formed on the steel plates.

An examination of this table brings prominently forward several points.

1. For short time protection, in such cases as the protection of steel for a few months by the application of a single coat, a red lead, white lead or one of the chromate group would be satisfactory.

2. The early and complete failure of the gilsonite and elaterite paints, indicating the unsuitability of these materials for this particular kind of exposure.

3. The close agreement between the groups comprising the two forms of carbon, namely, the carbon and the graphite groups. At the same time it should be noted that combinations of these two pigments have been much less effective.

4. The close agreement between the two carbon groups just mentioned and the iron oxide group is noteworthy. The only distinct advantage possessed by any of them

Comparative Average Percentage Ratings of Structural-Steel Coatings

Class.	One year exposure.		Two years' exposure.		Three years' exposure.	
	One coat.	Two coats.	One coat.	Two coats.	One coat.	Two coats.
	No. of tests.	Average rating, per cent.	No. of tests.	Average rating, per cent.	No. of tests.	Average rating, per cent.
Carbon ....	82	33	67	72	65	3
Carbon and graphite ..	5	13	5	38	5	0
Graphite ...	78	22	67	71	67	4
Graphite and iron oxide ..	5	49	5	81	5	15
Iron oxide...	101	48	98	77	74	8½
Iron oxide and red lead .....	5	34	5	60	5	11
Red lead....	61	65	50	81	50	24
Red lead primers ..	..	..	45	76	..	..
White lead..	40	62	28	88	24	17
Lead compounds (except red and white) ..	11	45	12	84	8	10
Zinc oxide...	9	31	9	69	9	0
Mineral hydrocarbons (no pigment) ...	62	32	68	58	48	8
Elaterite ..	12	8	12	24	12	0
Gilsonite ...	6	0	6	18	6	0
Mineral hydrocarbons (with pigment) ...	10	16	11	53	10	0
Vegetable hydrocarbons (no pigment) ...	4	4	4	52	4	0
Vegetable hydrocarbons (with pigment) ...	9	26	9	60	9	0
Cement ....	8	31	8	40	8	13
Chromate ...	20	50	30	76	14	8
Vehicle ....	30	6	15	35	30	0
Miscellaneous ..	103	41	121	67	68	7

appears to be in favor of the iron oxide for short-time single-coat work, while carbon appears to be somewhat better than graphite for the same purpose. It seems that

a mixture of graphite and iron oxide has some advantage over either used alone. Were it not for the small number of tests of this graphite and iron oxide group the showing made would command attention.

It should also be noted that zinc oxide compares favorably with carbon, graphite and iron oxide.

White lead appears somewhat superior to any other pigment except red lead for one-coat work, after either one year's or two years' exposure. For two-coat work, while it holds the honors for the first year, it has dropped down to the level of many others at the end of two years. The group marked "Lead compounds, except red lead and white lead," which includes such pigments as basic sulphate, sublimed blue lead, zinc lead, etc., is making a remarkably good showing throughout the test.

There is one other point which stands out prominently in the table, and that is the durability of the group of red lead primers. Very inferior paints were used for the second coat on many of the plates in this group and yet the average is well up with the best.

Ten samples of paints were tested which the makers claimed were rendered inhibitive by the use of chromates or chromic acid in some form. With these were tested a number of pigments and pastes containing chromium which were received from or through the laboratory of the Paint Manufacturers' Association. The averages of the results obtained with the chromates from the laboratory of the Paint Manufacturers' Association were much higher than those shown by the ready-mixed paints from the makers, especially for one-coat work. A comparison of the results obtained with ready-mixed and laboratory-mixed paints is shown in the table. The wide difference in favor of the laboratory-mixed samples would seem to indicate the use of inferior materials in the factory-made paints.

Comparative Results Obtained with Paints Received Ready-Mixed and Paints Mixed in the Laboratory; One Year Exposure

Class.	One coat.		Two coats.	
	No. of tests.	rating, per cent. Average	No. of tests.	rating, per cent. Average
Chromate paints received ready mixed .....	10	28	10	61.5
Chromate paints mixed in the laboratory .....	10	72.5	16	86
Carbon paints received ready mixed .....	70	26	56	69
Carbon paints mixed in the laboratory .....	12	74	11	90
Red lead paints received ready mixed .....	48	62	41	80
Red lead paints mixed in the laboratory .....	13	77	9	86
Iron oxide paints received ready mixed .....	72	42	69	74
Iron oxide paints mixed in the laboratory .....	19	88	19	93

In the case of red lead paints the difference does not appear to be so great, especially for two years' exposure. One interpretation of these results might be that, just as a small proportion of the proper chromate will render a paint inhibitive, so something less than 100 per cent. red lead will make a good protector for steel.

In the discussion Dr. Cushman thought Mr. Chapman's methods of rating novel and that if larger samples were used the results would be more valuable. He argued that caution should be taken in drawing sweeping conclusions, particularly in view of the large commercial bearing of the subject. A tribute was paid to the author for the great scope of the efforts made by him. It was noted that the pieces of metal painted were only 8½ per cent. of 1 sq. ft. in area.

Attention was called to the better performance of the laboratory tests. Mr. Chapman explained that pigments were submitted dry and ground in raw linseed oil and then thinned with linseed oil and 6 per cent. turpentine dryer. He felt with regard to his small size plates that they were generally consistent with the showing of larger samples. One member felt it should be understood the results of the experiments were submitted for such interest as they may have.

In this connection mention may be made of a paper by Henry A. Gardner, director, Scientific Section, Paint Manufacturers' Association of the United States, describing how paint oils are now under observation on a fence supporting 48 testing panels 22 x 1 x 9 in. on the grounds of the Institute of Industrial Research at Washington, D. C.

#### The Acid Corrosion Test

Another notable feature of the Wednesday evening session, if not of the entire meeting, was the extended reference to the acid corrosion test. It was mentioned by Dr. Cushman in his report of committee A-5; it formed the basis of a paper by Prof. W. H. Walker of the Massachusetts Institute of Technology and the subject of a paper



by Cloyd M. Chapman. No action was taken, however, in respect to the society's attitude on the subject.

Dr. Cushman briefly mentioned the preference for the lead acetate test in connection with the determination of the weight of zinc coatings of galvanized wire, but took the occasion to emphasize in closing that "the name of the American Society for Testing Materials continues to be used as having recommended the acid corrosion test and by inference as having indorsed the same. For this reason your committee desires at this time to again disclaim any recommendation or indorsement of the acid test as a measure of natural corrosion and to point out that any use of the name or authority of the American Society for Testing Materials in this connection is unwarranted."

#### Copper in Iron and the Acid Test

Prof. Walker's paper described an investigation of the effect of copper in iron on the acid corrosion test. He submitted a table, reproduced herewith, covering the analysis of four open-hearth steels and four irons. Where copper was absent the destruction of the metal in the sulphuric acid was relatively very great, being 40 times greater in the case of the irons. He referred to the fact that copper in contact with iron hastens destruction, but when it is in iron it retards it.

Dr. Cushman did not regard the presence of copper as the retarding agent, but it was a question of oxygen, involving a phenomenon not yet explained. He inferred that when the question of the presence of copper is considered one is entering the alloy field.

One member gave results of tests to controvert Prof. Walker's investigation. He gave the composition of elec-

Relative Solution in Acid of Different Metals.

Steels.					
	Copper.	Man-ganese.	Sulphur.	Phos-phorus.	Loss, per cent., in sulphuric acid.
A <sub>1</sub> .....	0.08	0.5	0.018	0.017	3.7
A <sub>2</sub> .....	0.08	0.5	0.018	0.017	0.12
B .....	0.10	0.41	0.027	0.026	0.12
C .....	0.09	0.31	0.031	0.063	0.14
Irons.					
E .....	0.02	0.06	0.035	0.006	18.83
F .....	0.02	0.02	0.022	0.005	0.44
G .....	0.02	0.25	0.041	0.009	0.59
H .....	0.02	0.06	0.04	0.003	0.44

trolitic iron, American ingot iron and Swedish iron, each of which was subjected to a 4-hr. 60 deg. C. acid test with losses, of 7, 24 and 46 per cent. respectively. Among other constituents the electrolytic had carbon, 0.006; oxygen, 0.032, and copper, 0. The American ingot had 0.01 carbon, 0.027 oxygen and 0.5 copper. The Swedish iron 0.05 carbon, 0.058 oxygen and 0.43 copper. A 100 per cent. loss was reported for a case where the copper was 0.03.

It was remarked that copper in one case may be in solid solution and in another in an alloyed condition, and then the material could not be admitted as a pure iron.

#### Actual Versus Accelerated Corrosion

Mr. Chapman's paper illustrated the behavior of two plates, one of iron and the other of steel, subjected to weather exposure for 18 mo. They exhibited little difference unless the iron were slightly more corroded. In a 12-hr. acid test, however, the steel suffered badly in comparison.

One member thought it wise for the members to give careful consideration to the acid test before it is discredited. There is one marked difference. With a number of grades of iron there is a great range in the acid test results, but in actual weather exposure there is a much less range.

Dr. Cushman here took the occasion to explain that individually his ideas had not changed, and the committee's statement referred to earlier in this report of the discussion marked the majority's views. He had decided it wise not to introduce a minority report.

#### Practical Testing of Oil Adulteration

Easily the spectacular feature of the meeting and unquestionably popular from the practical and far-reaching importance of its bearing was the paper of Alexander E. Outerbridge, Jr., entitled "A Novel Method of Detecting Resin Oil and Mineral Oil in Other Oils." The advance copies shared in the demand for them with Dr. Cushman's paper on the manufacture of pure irons in the open-hearth furnace, copies of both papers being early exhausted. Extended reference is to be in these pages to Mr. Outerbridge's contribution, the full extent of the influence of which it is hard to forecast. It amounts to the discovery

that the slightest addition of a rosin or mineral oil to a vegetable oil, like linseed, makes the mixture fluorescent in the ultra-violet rays, such as are obtainable with an inclosed arc light, and, moreover, an ordinary employee can make a close quantitative estimation of the degree of adulteration. The phenomenon is true even with so-called de-bloomed oils which are marketed as linseed, for example.

#### Heat Treatment of Spring Steel

A report to committee A-7, Henry Souther chairman, covering an investigation of heat treatment of steels for springs, was received on Thursday afternoon from the sub-committee: A. A. Stevenson, A. N. Lukens, J. E. Howard, F. D. Carney and E. D. Nelson, chairman. The report also covered an analysis of transverse, hardness and bending tests. It was found that at a quenching temperature of 1500 deg. F. the maximum elastic limit was obtained with a drawing temperature of about 600 deg., while where the quenching temperature was 1650 deg. the maximum elastic limit was found when the drawing temperature was about 800 deg. In the former case it was noted that the angle of bend at rupture was an average of slightly over 59 deg., there being considerable variation in the specimens, while with the following group the average angle at rupture was slightly over 103 deg. It was not conclusively proved that there is a definite relationship between hardness numbers and elastic limits.

#### Hardness Tests and Machines

A leading feature of the steel section of Thursday afternoon was the consideration of the following papers: "Hardness Tests," by Prof. Bradley Stoughton and J. S. Macgregor; "Comparison of Five Methods of Hardness Measurement," by R. P. Devries; "Hardness in Relation to Other Physical Properties," also by Mr. Devries, and "The Property of Hardness in Metals and Materials," by Albert F. Shore, president Shore Instrument Company, New York.

Mr. Macgregor described a machine for ascertaining the resistance of materials to abrasion, like the wear that occurs in the bottom of an engine cylinder. It involved whetstones running dry at 400 to 500 r.p.m. and exerting a pressure of 1 lb. each on the specimens tested. With six specimens tested each was moved to a new position after 700,000 r.p.m. and after the six changes of position had been consummated the loss of diameter and loss in weight was determined.

Mr. Devries described five hardness machines and explained at length the interesting experiences and results of measuring the depth of indentation of a hard sphere into the metal under investigation when pressure was applied by a hydraulic ram. By means of a micrometer-microscope the movement of a line on the ram piston was measured with a definite loading or pressure developed by the ram and then the degree of return of the line when the load or pressure was removed gave a measure of the depth of indentation. For example, with a certain loading the line moves parallel to itself a measured distance, but on unloading it does not recover the distance, the recovery measuring the temporary deformation of the machine and the lack of recovery the permanent indentation. It was suggested to refer hardness to the load necessary to produce 1 millimeter of indentation depth.

Mr. Shore's paper announced a semi-automatic scleroscope capable of giving 5000 hardness readings per day and described a hardness machine for testing rubber and similar materials.

Dr. Howe opened the discussion and emphasized how important it would be commercially to develop a hardness test which could if possible replace the tensile test in regular manufacturing operations, leaving the tensile test for the more exact information that will be necessary.

Dr. Leonard Waldo paid a tribute to the papers of Mr. Devries and described an instrument he used which was about the size of a drawing instruments' case and highly portable. It involved a standard carrying a plummet suspended from a silken cord with a 60-deg.-angle cone-striking point at the bottom of the plummet. This was held about 12 in. above the metal to be tested and given a free vertical fall by a trigger releasing of the cord. With the apparatus was a microscope which was provided with a scale in the plane of vision so direct measurement could be made of the diameter of the depression or indentation made in the metal. He regards the way to measure hardness is by the displacement of the metal.

### Overstrained Structural Material After a Period of Rest

An interesting paper on the effect of gagging or overstraining of structural material in straightening it was read by Prof. E. L. Hancock of the Worcester Polytechnic Institute. It explained the different physical characteristics of the web, flange and root of beams and indicated that there was increase in desirable characteristics after a period of rest. Arrangements have been made for printing the paper substantially in full in these columns.

### Sulphur in Boiler Tubes

F. N. Speller, metallurgical engineer of the National Tube Company, described the method of flattening and flanging the crop ends of tubes as a means of testing their thoroughness of manufacture and justification for commercial use. This has already been illustrated in *The Iron Age*. He emphasized that low sulphur does not always mean higher weldability. In a test of 1200 pieces of tubing of 0.045 per cent. sulphur the loss was 14 per cent. against a 20 per cent. loss with 0.027 sulphur. In another case there were 20 per cent. more bad welds when the sulphur was below 0.03 per cent. than when it was over 0.04 per cent. He considered that the rigorous specification in this respect had been overdone and that 0.05 per cent. sulphur would be altogether satisfactory.

He exhibited a chart covering records of the additional sulphur absorbed by locomotive tubes in practice. There was an indication that the tubes with the less amount of sulphur initially absorbed the greater amount in use.

It was voted to refer to a letter ballot a committee report on proposed standard methods for transverse tests.

### Testing Apparatus and Methods

Friday afternoon's session was given over to methods and apparatus for testing. A report of committee A-6 was received relating to proposed magnetic tests of iron and steel. It was voted to submit it to the membership for a letter ballot.

An ingenious method of subjecting teeth of a gear to shock which could be measured was described by Prof. Bradley Stoughton, who together with Prof. J. S. Macgregor submitted a paper on the subject. The point was that fracture of the teeth of a pinion in practice occurs as a result of suddenly applied load rather than of a static load, and such a test was essential. The investigation covered a test of a case hardened gear and one of a uniform carbon content.

Two papers were read by T. Y. Olsen, one describing a new type of impact testing machine for determining fragility of metals and the other describing a new type of autographic transverse testing machine for research or regular foundry practice. The author said the deviation from the average of the results obtained from the impact machine was not essentially different from that true of tensile tests.

Mr. Outerbridge mentioned how about 20 years ago he had discovered the possibility of getting 25 to 30 per cent. better transverse test results after tumbling the specimens. He also told of his early experiments with impact tests in which by subjecting the specimens to successively increased falls of the hammer the iron acquires an increased strength. These phenomenon he had explained as due to rapid readjustment of the molecules involving the overcoming of cooling stresses.

### Fritz Engineering Laboratory

The Fritz Engineering Laboratory given to Lehigh University by John Fritz was described in a paper by Prof. F. P. McKibben of Lehigh University at the Saturday morning session. There are four sections in the Laboratory, as follows:

(1) A general testing section including the testing machinery and a small machine shop; (2) a room for testing cement; (3) a room for making and storing concrete specimens, such as beams and cylinders; and (4) a hydraulic section.

One of the machines is a 800,000-lb. machine, capable of testing a column of 24 ft., a tension specimen of corresponding length, or a transverse specimen 10 ft. long or less. It is possible to test beams up to 25 or 30 ft. in length by using extension girders on the weighing table.

### Elastic Properties of Iron Carbon Alloys

An interesting paper was read at the Saturday morning session by Prof. C. R. Jones of West Virginia University, Morgantown, W. Va. The object was to de-

termine whether any relation existed between the variation of the tensile properties and certain known magnetic properties of a series of steels. The steels were made by the crucible process and after being rolled were allowed to cool in air. There was a small variation of all the elements in the series proper except carbon, and microscopic study showed the steels to be quite homogeneous. The carbon varied from 0.60 to 1.37 per cent., while the phosphorus varied from 0.01 to 0.013 per cent., the silicon from 0.14 to 0.19 per cent., the manganese from 0.14 to 0.17 per cent., and the sulphur from 0.012 to 0.014 per cent.

The results of the tests made by the writers would indicate that pure iron should have a tensile strength of about 40,000 lb. per square inch, and that the tensile strength of the series of annealed crucible steels tested increased about 630 lb. for each 0.01 per cent. of carbon up to 0.89 per cent., after which the strength gradually decreased.

The variation of the modulus of elasticity with the carbon content in the series of steels tested by the authors followed the same general law as the maximum strength and elastic limit and the values ranged between 22,000,000 and 40,000,000. The curves for total elongation and reduction of area were similar, and indicate that there is a critical point in each corresponding to the percentage of carbon which gives maximum strength. A comparison of the curves between the tensile strength and carbon, and those for the magnetic hysteresis loss, showed a striking similarity as to shape.

D. E. Douty was glad to see the attempt made to couple the magnetic and tensile properties. He volunteered to measure the hardness of the specimens to discover the relations of this feature and the remainder of the characteristics. There was considerable discussion over the variation shown by the authors in the modulus of elasticity. H. C. Boynton, Trenton, N. J., said that in some tests he had made with low-carbon annealed wire of 0.10 carbon and 0.12 manganese, moduli of elasticity of 22,000,000 to 23,000,000 were obtained until he had some 50 tests of utmost accuracy when the values ranged between 29,000,000 and 30,000,000. He mentioned, however, his results might not be comparable with those on the pure iron tested by the author.

### Government Fuel Investigations

A report of the committee on coke was, in the absence of the chairman, read by A. W. Belden of the Bureau of Mines of the United States Government, Pittsburgh.

He also reported on the progress of fuel investigations being made by the Bureau of Mines. This work includes investigation of combustion and of the conditions transpiring in the cupola. The work, for example, has shown that it is possible easily to burn 52½ per cent. of the iron. A later report promises much valuable information in this particular.

The Bureau has this year analyzed and reported on over 1,000,000 tons of coal of all kinds, the value of which is worth \$5,000,000; and the work of the laboratories is represented by more than 7,000 samples. The cost of this work, per sample, is about \$1.54, equivalent to 1.33 cents per ton or 0.48 per cent. of the cost of the coal.

### Miscellaneous Business

It was voted that the executive committee appoint a committee to formulate a standard specification as regards form but not substance.

Secretary Marburg discussed the probability of the papers' being distributed earlier in advance, and of closer censorship being exercised in respect to the papers.

The executive committee, it was announced by the secretary, had decided to declare a dividend in the shape of an index to the proceedings up to date.

### Entertainment

A record for attendance marked the meeting. There was a total registration of over 450, of which 98 or 100 were ladies. There were a third more members than were present last year. The entertainment committee, of which Anderson Polk was an energetic member, arranged for the use by ladies of Atlantic City's rolling chairs on the Board Walk on exhibition of the ladies' badges and provided for a vaudeville entertainment and also a smoker on one of the evenings and entertained at the Atlantic City Country Club, the journey to which was made in autos.



## The Davis-Bournonville Company's Increased Facilities

The Davis-Bournonville Acetylene Development Company has united with the National Pneumatic Company, of Chicago, in making the Davis-Bournonville Company their exclusive agent for welding and cutting apparatus, and have added largely to its working capital and executive ability. The National Pneumatic Company has been handling the Davis-Bournonville Company's apparatus almost since its introduction, through its Chicago Welding Company department. Many ideas of importance have been developed, and a wide and valuable experience acquired, so that high-class ability, as well as additional financial strength, has been added to the selling company.

J. B. Burdett and Harold Rowntree, of the National Pneumatic Company, and also widely known as the principals in the Burdett-Rowntree Mfg. Company, will participate actively in the management of the Davis-Bournonville Company; Mr. Burdett as treasurer, and Mr. Rowntree as vice-president. Hugh L. Adams, who has achieved a high reputation in the industry, as manager of the Chicago Welding Company, will be the manager of the Western department. Augustine Davis will be president, and C. B. Wortham will be secretary and assistant treasurer of the company.

The business will be divided into the Eastern department, with offices in its present quarters at 90 West street, New York, and the Western department, with offices at 515 Laflin street, Chicago. The consolidation thus effected places the combined resources and experience of these companies at the service of all prospective users of autogenous apparatus.

## Heat Treatment on Acid and Basic Open Hearth Steel of Similar Composition\*

BY HENRY FAY

It is generally conceded from the results of the work of Campbell and of Webster that acid open hearth is superior in quality to a basic steel of similar composition, but so far as the author knows no attempt has ever been made to see whether or not the superiority holds for variously heat-treated specimens. To test this, two steels were selected of the following composition:

	Acid Open Hearth. Per cent.	Basic Open Hearth. Per cent.
Carbon .....	0.43	0.42
Manganese .....	0.6	0.6
Phosphorus .....	0.027	0.009
Silicon .....	0.067	0.033
Sulphur .....	0.05	0.055

These two steels were made under the same conditions for similar purposes. The chief differences in composition are in phosphorus and silicon, as would be expected. The steel was received in the form of bars, 0.24 x 2 x 3/4 in., and was used in this form for heat treatment. The heating was accomplished in an electrically heated muffle-furnace, and temperatures were determined by means of thermo-couples of platinum and platinum rhodium.

Each steel was subjected to the following heat treatment: 1.—Heated to a definite temperature and immediately cooled in the air. 2.—Heated to definite temperature, held constant for 2 hr. and then cooled in air. 3.—Heated to definite temperature and cooled in the furnace. 4.—Heated to a definite temperature, held constant for 2 hr. and then cooled in the furnace. The results of the physical tests on each series are shown in the accompanying table, in which A represents acid steel and B stands for basic steel.

The bars after heating were machined into 18-in. test bars with a parallel section 1 1/2 in. wide x 9 in. in length between shoulders. The section in the jaws of the testing machine was 2 in. in width.

Tests on the original bars were made and gave results as follows:

	Tensile Strength, lb. per sq. in.	Elastic Limit, lb. per sq. in.	Elongation, per cent. in 8 in.	Contraction of area, per cent.
Acid .....	85,400	43,700	20.3	43.2
Basic .....	73,500	37,700	25.	39.6

The results obtained on the heat treated specimens are given in the accompanying tables.

Physical Tests of Heat Treated Acid and Basic Steels.

Series	Specimen	Temperature	Tensile Strength, lb. per sq. in.	Elastic Limit, lb. per sq. in.	Elongation, in 8 in.	Contraction of Area
Series 1—						
A	.....	700	78,300	35,300	21.1	.....
B	.....	700	72,600	33,500	22.6	.....
A	.....	750	77,500	34,200	22.2	.....
B	.....	750	70,300	32,200	21.5	.....
A	.....	800	79,800	33,700	18.8	.....
B	.....	800	73,500	30,500	18.8	.....
A	.....	900	81,700	44,000	20.4	.....
B	.....	900	74,200	38,500	24.2	.....
A	.....	1,000	81,700	40,200	18.8	.....
B	.....	1,000	73,000	36,000	25.	.....
Series 2—						
A	.....	700	75,100	37,200	21.1	.....
B	.....	700	67,800	29,600	27.	.....
A	.....	750	75,700	35,400	14.5	.....
B	.....	750	68,200	33,400	14.	.....
A	.....	800	79,700	35,800	22.3	.....
B	.....	800	68,300	32,800	22.3	.....
A	.....	900	77,200	34,400	21.2	.....
B	.....	900	68,100	32,500	20.8	.....
A	.....	1,000	79,700	34,200	20.8	.....
B	.....	1,000	68,900	32,400	20.4	.....
Series 3—						
A	.....	700	67,000	33,500	14.8	44.2
B	.....	700	70,800	26,100	18.7	44.8
A	.....	750	80,100	38,700	21.0	45.6
B	.....	750	66,900	30,000	23.4	48.7
A	.....	800	80,200	37,500	21.8	42.7
B	.....	800	72,200	38,200	22.7	44.5
A	.....	900	73,500	39,800	21.8	41.1
B	.....	900	65,700	33,800	28.9	41.3
A	.....	1,000	73,100	33,700	22.6	37.9
B	.....	1,000	68,100	26,100	25.7	38.0
Series 4—						
A	.....	700	77,030	37,990	14.0	51.3
B	.....	700	66,670	33,200	24.2	44.6
A	.....	750	74,680	38,200	23.4	51.4
B	.....	750	67,400	34,200	25.0	45.6
A	.....	800	71,300	37,600	25.0	47.4
B	.....	800	63,600	31,800	26.5	48.4
A	.....	900	72,500	37,900	23.4	37.8
B	.....	900	72,300	34,400	22.6	46.4
A	.....	1,000	71,200	37,000	22.2	36.8
B	.....	1,000	64,600	34,200	21.3	37.3

The results are very incomplete and are to be considered qualitative rather than quantitative, but they seem to show superiority not only of the acid steel as originally received from the mill but also when subjected to heat treatment. These differences cannot be accounted for by the carbon as the results were checked by two independent workers and these in turn checked against the mill analysis. The maximum variation in percentage of carbon can hardly be more than 0.03 per cent., and if it were so considered it could not account for the variations in tensile strength of 6000 to 10,000 lb. per square inch. Whether or not these differences can be accounted for by the phosphorus and silicon, both of which are higher in the acid than in the basic steel, only more extended investigation will show. To a person not connected with a mill it would be difficult to follow these results to the logical conclusion, and they are now offered with the hope they may be of some value to others who may wish to carry the investigation further.

The microstructure of the various bars was studied with the hope that some difference might be found, but there was a marked similarity throughout the series. In the original specimens as received from the mill the basic steel seemed to show the effect of work slightly more than the acid steel.

The heat treatments, however, did not have the usual effect. In the specimens heated to the higher temperature beginning at 900 deg. there was a very considerable tendency for the pearlite areas to become more dense in appearance and to segregate along lines parallel to the direction of forging. There was very little tendency toward the usual enlargement of the grain size except in limited areas.

The Scottdale Foundry & Machine Company, Scottdale, Pa., builder of rolling mill machinery, complete mine equipments, etc., has recently installed in its foundry an Adams molding machine for handling its smaller specialties, such as bearings, etc. It is furnishing for the Pittsburgh filtration plant a large runner shaft for a 35,000,000 gal. centrifugal pump. A recent shipment comprised six complete mine cages and six extra platforms for the Cerro de Pasco Mining Company, Peru, while a recent contract from the Leach Collieries Company, Alberta, Canada, covers an electrically operated pusher and coke leveler.

\*Paper read before the American Society for Testing Materials, Atlantic City, N. J., June 28.

†Professor of Analytical Chemistry, Massachusetts Institute of Technology.

## The Cincinnati Bickford Shops

The New Plant at Oakley Is a Striking Exposition of Modern Manufacturing Arrangement—Interesting Space and Labor Saving Ideas

The Cincinnati Bickford Tool Company, Cincinnati, Ohio, has occupied its new plant at Oakley. The works are essentially modern and demonstrate in a myriad of

each have been given a great deal of thought in all of their details. Oakley, forty minutes out by trolley from the business center of Cincinnati, is the home of a colony

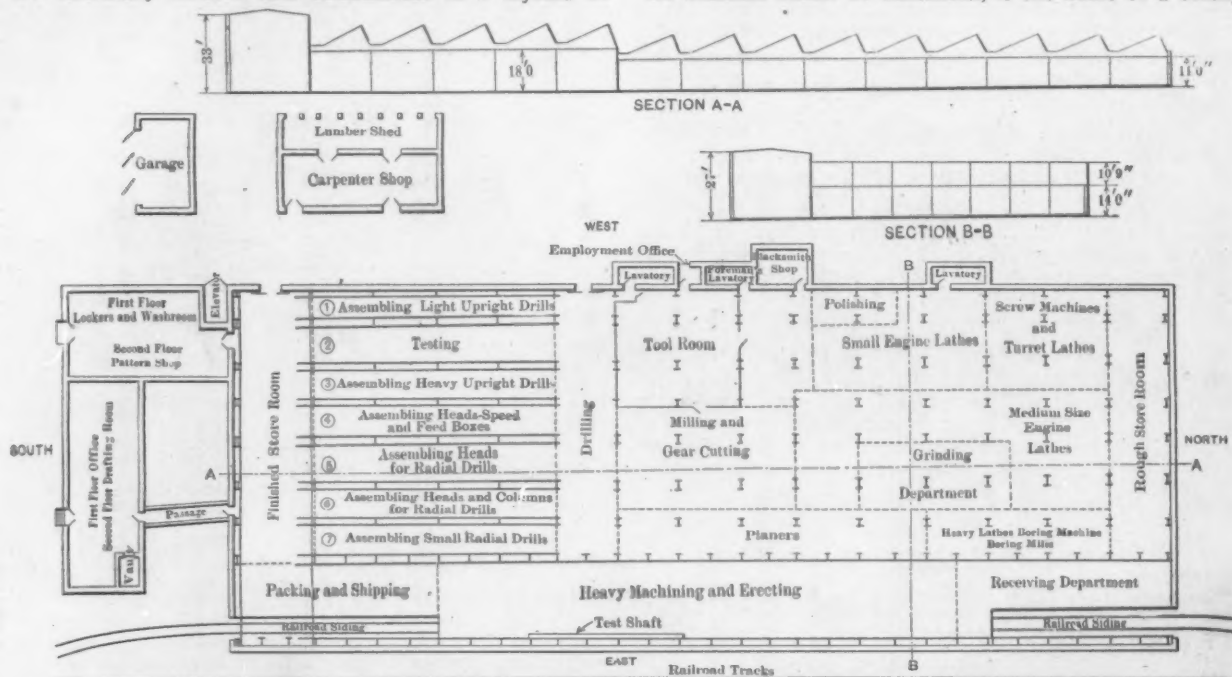


Fig. 1.—Plan of the New Plant of the Cincinnati Bickford Machine Tool Company, Oakley, Ohio.

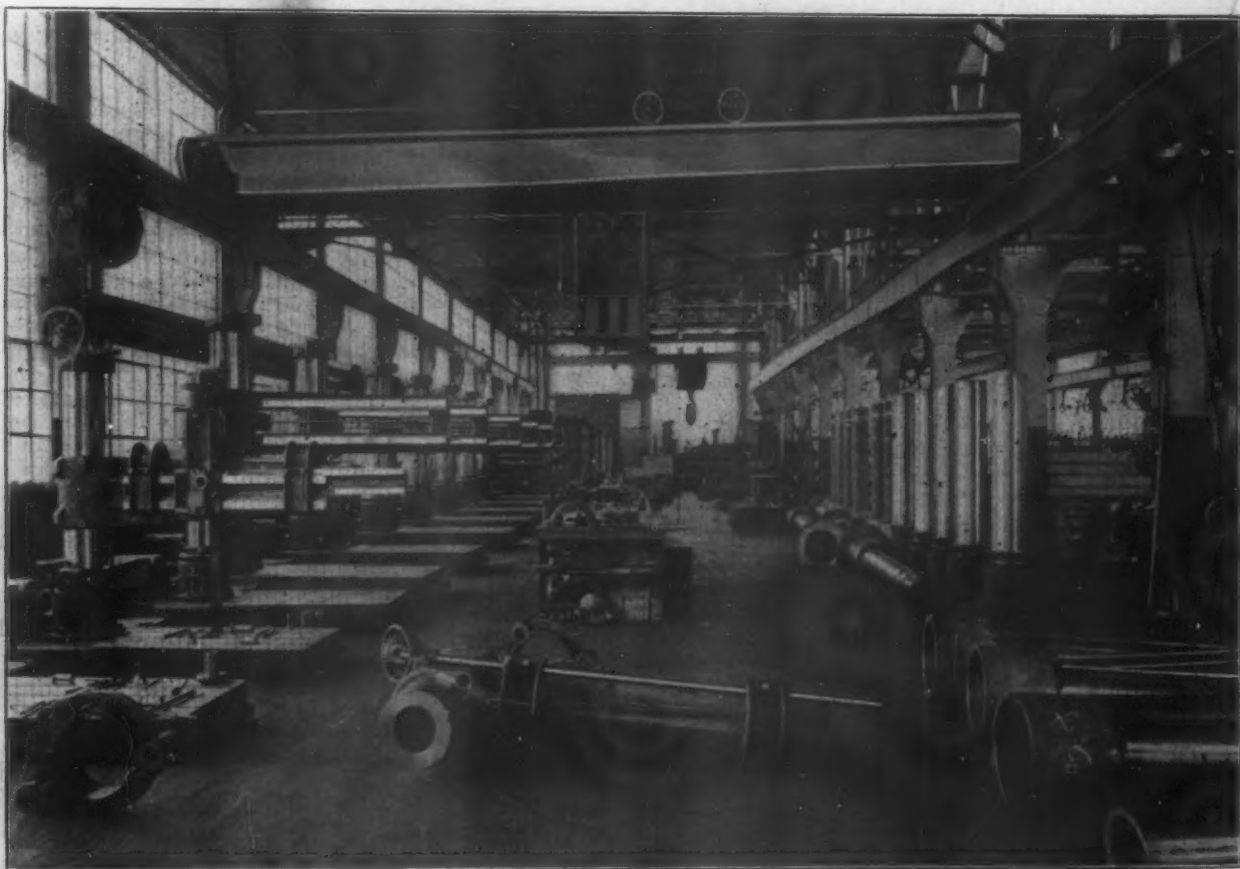


Fig. 2.—The Heavy Machinery and Erecting Department with the Packing and Shipping Department in the Background.

ways the results of careful planning. The lighting, ventilation, heating and most important of all, the arrangement to secure economical manufacturing facilities, must

of manufacturing establishments and is rapidly becoming one of the most important machinery centers of the country.



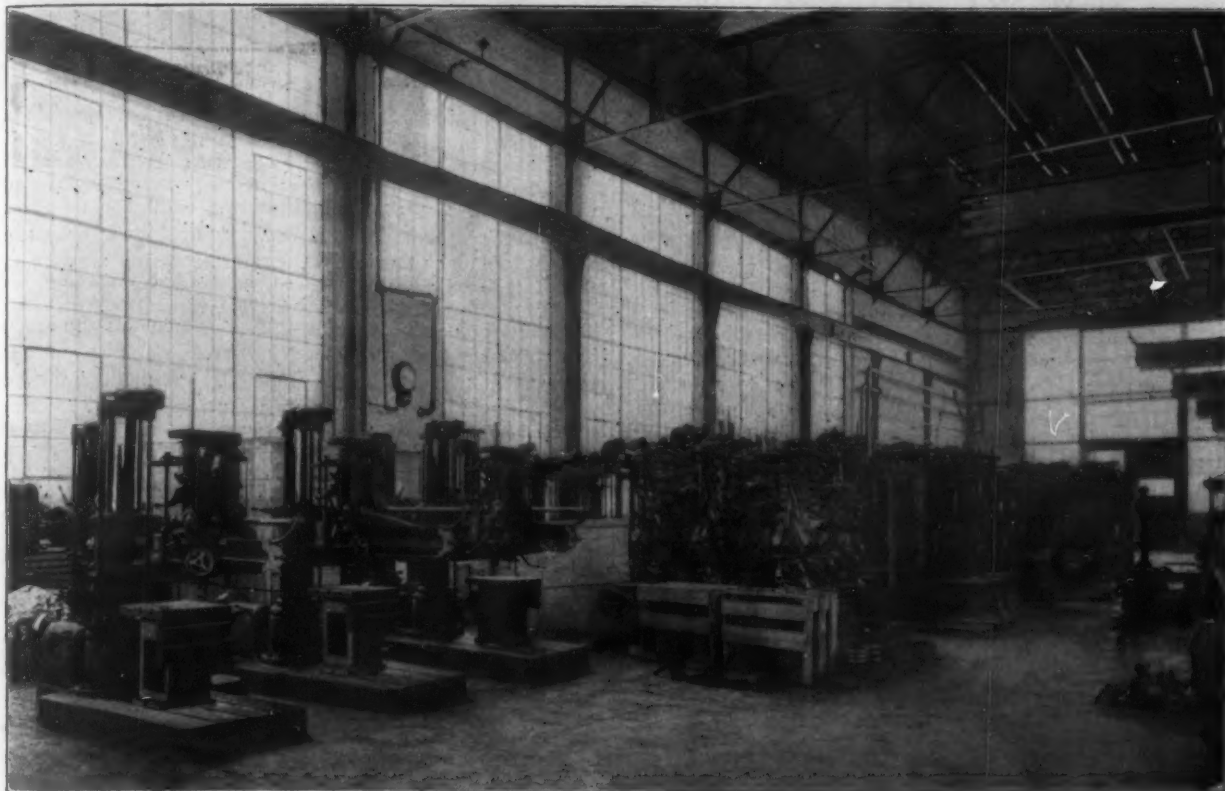


Fig. 3.—The Finished Storeroom, Showing the Ends of the Crane Runways of the Assembling Bays.

The general layout of the Cincinnati Bickford shops is seen in Fig. 1. The main building is a one-story structure 165 x 430 ft., with saw-tooth roof. Only the office in the adjoining ell, containing also the washroom, has two stories. A depressed siding from the railroad which passes the plant enters the shop at each end. The reason for this rather novel arrangement is that a large amount of floor space is saved as compared with the situation did the track pass completely through the shop. Each spur enters to a distance of 90 ft., giving ample room for two cars, a sufficient accommodation at any one time. The rails are 4 ft. below the level of the shop floor, which is level with the car floor, an arrangement facilitating load-

ing and unloading. The track at the north end, seen in Fig. 2, takes incoming freight, such as rough castings and bar stock, while that at the other end is used for the shipping of finished machines. This is in harmony with the general scheme of the routing; the product passes in the various steps of manufacture from north to south without unnecessary handling.

#### The Heavy Machinery Department

The tracks run lengthwise of the building, and enter a long bay, 35 ft. wide, which contains the largest and heaviest machines that take care of such heavy castings as require to pass through this room only. Here are a

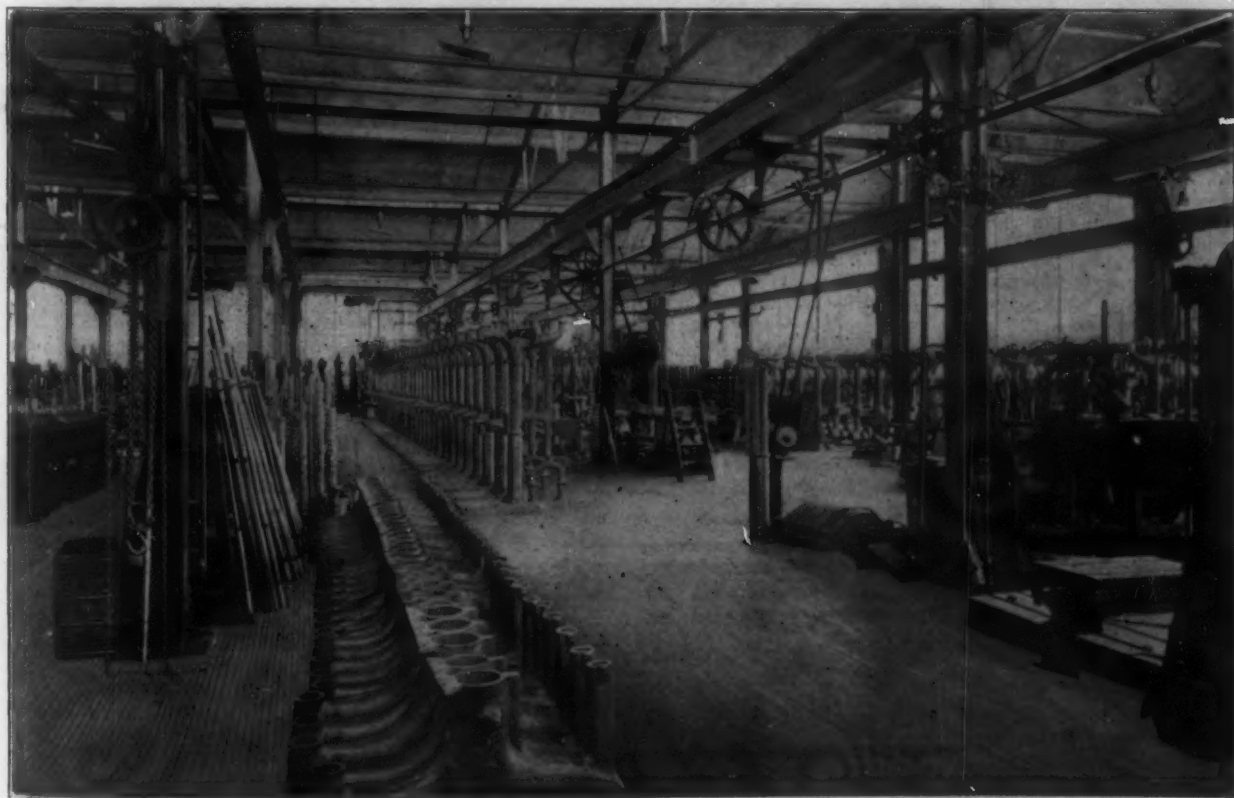


Fig. 4.—A View Showing Departments for Assembling and Testing Light and Heavy Upright Drilling Machines.

lathe for turning heavy drills, columns and sleeves; a boring machine for large castings, two planing machines and large radial drilling machines. The remainder of the floor space is devoted to the assembling and testing of the large sizes of machines. The bay is served by a 15-ton Pawling & Harnischfeger cage-operated crane, which handles heavy parts about the machines and moves them from, or places them upon the cars.

The most northerly bay is occupied as a stock room for rough materials and for small parts made in the shop or purchased from outside. The material used in the manufacture of small or medium-sized parts is issued directly from this room, a long counter separating it from the remainder of the shop. Immediately outside are the cutting-off machines, the turret lathes for castings and the screw machines for bar stock. Close by the turret lathes is the bench for hand reaming, the tools being kept on the bench so as always to be accessible. Each reamed hole is tested with a steel plug to insure its accuracy, and should

chines, which are located in a space crossways of the shop, and thence on to the several erecting and assembling departments.

#### An Interesting Crane System

Occupying the extreme south end of the shop is a large bay, Fig. 3, 35 ft. wide and served by a 10-ton Toledo cage operated crane, which is set apart as a store room for machines which have been assembled and tested and are awaiting shipment. This section is higher than the remainder of the building in order that the crane may run at such a height that all the cranes from the assembling floors, each of which is served, may pass under and deliver work directly beneath the large crane, the tracks of the small cranes, each projecting 7 or 8 ft. into the bay. The crane places the finished machine in position in the store room and later loads it directly on to the railroad cars, lifting it, if desired, over its neighbors. The space in the store room is divided between the upright and the radial drilling machines. Near the track are scales and



Fig. 5.—The Assembling of Small Radial Drilling Machines.

the reamers be found under size they are returned at once to the tool room for readjustment and grinding. Fixtures, tools and jigs are stored in several places in the shop, the purpose being to keep each set close to the machines in which it is used.

In natural sequence the engine lathes are grouped immediately adjoining the turret lathes, and here, too, are two turret lathes that are used exclusively for the making of bronze bushings. It should be borne in mind that no partitions separate the departments, the dotted lines of the drawing merely indicating the limits of space devoted to each. Leaving the lathes the parts go immediately to the neighboring grinding department, and those which are not ground to the polishing department, which are next in order in the machine arrangement. In the space adjoining are the gear cutting and milling machines, together with the key-seating and broaching machines.

In the bay which adjoins that containing the railroad tracks, are machines suitable for medium-sized work, including heavy lathes, large grinding machine, boring machines, boring mills and medium and small-sized planers. This bay is served by several small cranes. From these several departments the work goes to the drilling ma-

a space devoted to crating for shipment. The entrance of the railroad tracks into the shop is closed by vertical rolling steel shutters.

From this bay extend seven longitudinal bays, as seen in the ground plan, and the first three of them in Fig. 4. These are devoted to assembling. In the first are erected the lightest upright drills built by the company, in the third and larger sizes. In the second are tested the machines after they have been assembled in the first and third bays, from which, upon completion, they are immediately moved that room may be made for new work. The fourth bay is devoted to the assembling of heads and feed boxes for upright drills and speed boxes for upright and radial drills, everything in the works being built strictly on the unit system. In the fifth bay the heads of both universal and plain radial drilling machines are assembled, and in the sixth small radial drill heads, as well as back gear brackets for the large radials. The seventh bay, Fig. 5, is given up to small radials, and the tables for the large radials are fitted up there. The small radials are tested in the space where they are assembled, being driven from the shafts which run lengthwise from the bay.



### The Tool Room and Employment Office

The tool room, located at about the center of the shop on the west side, covers a space of 48 x 56 ft. It has a counter at the front and sides, the space underneath being utilized for racks or drawers containing the small tools. The room is equipped with grinding machines, lathes, drill presses, an arbor press, a shaper and a milling machine. Two benches are provided, one for the making and adjustment of small tools and one for the making of jigs and fixtures, boring bars, etc.

Adjoining the tool room is an employment office from which the applicant may be quickly taken to the department in which he desires to work. Usually the foreman of that department personally interviews the man and recommends him to the general foreman if he is found suitable for the work on which he would be employed. The sanitary arrangements are also centrally-located, and a separate wash-room with lockers is provided for the foreman. The blacksmith shop at the west side of the shop takes care of tool dressing, light forging and case-hardening. The carpenter shop is located a short distance from the main shop, near the south end, so that lumber for crating machinery, etc., may be brought directly through the stock room to the shipping floor.

cables carry the electric current to the northwest corner of the machine shop, where the switchboard is located. The wiring to the motors is carried in conduits beneath the floor.

The shop is excellently lighted by 91 Cooper-Hewitt lights, as is well illustrated in Fig. 6, which is reproduced from a photograph taken at night with no other means of illumination than that of the regular lamps. The Evans-Almirall system of hot-water heating is installed, wall and overhead coils being provided. The hot water is obtained from the power house and brought to the shop in pipes laid in a concrete duct. Drinking water is from six "bubbling" fountains distributed throughout the building.

The machine shop and assembling departments have a saw-tooth roof, the bays running east to west. These, however, extend only to the south and east bays, which are built independently of the regular construction. The distance from the floor to the trusses supporting the roof over the assembling floor is 18 ft., and over the tool room and machine department, 14 ft. Cast-iron hangers let down the stringers for the shaft hangers to a distance 12 ft. from the floor, a height which has been found best as to length of belts for the machines. The reason for hav-

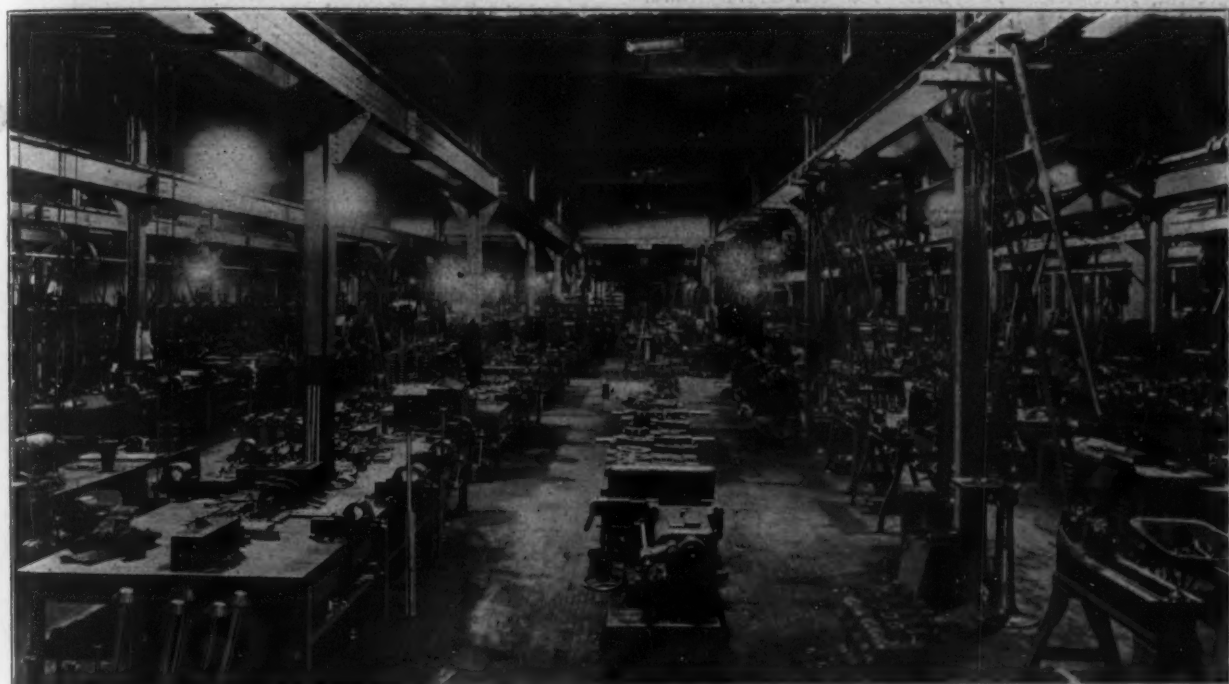


Fig. 6.—The Main Bay, with the Cooper-Hewitt Lighting System.

The main office and the wash room and lockers for the employees are on the first floor of a two-story building at the south end of the machine shop. The floor over the wash room is utilized for the pattern shop, and on the second floor of the office building is the drafting room. In this building is a two-story vault, the lower part for the main office, the upper for the drafting room.

The shop has a capacity for from 400 to 500 men, although at the present time only about 300 are employed. A comparatively small floor space is required for the efficient working of a relatively large force when a shop is laid out for systematic manufacturing. The quantity of the product, which can be turned out for an equal floor space, is also greatly enhanced by a wise planning of the shop.

### The Power and Transmission

Six line shafts furnish power for the machine tools, running north and south, each with its own motor placed at a height of about 6 ft. above the floor. The assembling floors are provided with motors for the line shafts from which the machines are driven when tested, and from it power is derived for small machines used for fitting purposes. In all there is about 1800 ft. of line shafting. Practically all the bearings in the line shafts are of the Hyatt roller type. Power is obtained from a central power station, located 500 ft. north of the factory, in which the company owns an interest. Underground lead-covered

ing the trusses in the machine shop 2 ft. higher than the shafting is to provide better ventilation. The roof windows face north, the total length of the sash being 126 ft. The upper section of the sash swings out and is operated by a chain from the floor, the entire length of each sash being opened from one point. All window sashes are of metal and the roof is of reinforced concrete construction. The shop floor consists of 3-in. pine boards nailed into sleepers laid into a 5-in. layer of tarred concrete. The top of the floor is 3/4-in. maple. Automatic sprinklers are located everywhere.

The building was designed by Dodge & Day, Philadelphia, Pa., in conjunction with S. C. Schauer, vice-president and general manager of the Cincinnati Bickford Tool Company, and the machinery layout was taken care of by Mr. Schauer and Mr. Schafer, the superintendent of the shop.

The Davis-Bournonville Company, oxy-acetylene cutting and welding, 90 West street, New York, cut out a ventilator hole and two gangways on the new steamship Olympic while she was at the dock in the harbor of New York.

The plant of the Damascus Nickel Steel Company, Carnegie, Pa., was sold last week by the Trust Company of North America, trustee, at public auction to the bondholders for \$6,000.

# The New Iroquois Blast Furnaces

## The Iroquois Iron Company's Improvements at South Chicago

At South Chicago, Ill., about one-half mile from its present plant, two 400-ton blast furnaces are being built for the Iroquois Iron Company. They are so far completed that it is hoped they can be blown in before the end of the year. The project for building this additional capacity had its inception several years ago. At that time, and even now, the occasion simply for increased capacity to supply the growing consumption of pig iron in the Chicago district, although apparent to the far-sighted, was not the important consideration. Lower cost of production had become a fundamental necessity.

### Why These Furnaces Are Being Built

There are within the immediate environs of Chicago and Milwaukee six separate blast-furnace interests, operating 11 stacks, with a maximum output of foundry and malleable pig iron aggregating over 800,000 tons. Yet under market conditions in which low prices prevail, as at present, Detroit and Toledo furnaces can deliver iron to northern Indiana points and even to Chicago on a freight rate of \$1.70 and undersell Chicago iron. While Chicago iron is at present handicapped by local switching charges that, on long hauls, are absorbed, the inability to compete on the basis of producing cost has been in itself responsible for the loss of the sale of no small tonnage naturally within Chicago territory. The plans for a new furnace

making of its blast furnace site, this larger opportunity has not been lost from view.

This furnace installation will also be unique in the West in the character of its power equipment. Blast for the furnaces will be furnished by three General Electric turbo-blowers of the type installed at the Oxford furnaces in New Jersey and at the Port Henry furnaces in New York. The South Chicago installation, somewhat modified in design, is the third of its kind. In economy of power house space, efficiency and continuity of wind pressure the turbine blower is expected to establish new precedents in blowing practice. These blowers are driven by Curtis steam turbines and are rated to develop 2900 hp. They are also expected to deliver 44,000 cu. ft. of air per minute each and supply a maximum pressure of 30 lb. per square inch at a speed of 3600 r.p.m. What the actual tests of these units will show can only be determined after they are connected up under the operating conditions of this plant. The wind pressure from the blower is automatically controlled by means of a regulator in the air suction which controls the quantity of air admitted to the blower vanes.

For the new plant a total area of 78 acres is included within a frontage of 1700 ft. on the lake and 2000 ft. on the river. Along this entire frontage a close-driven rock-filled pier, built of two rows of oak piles, driven through

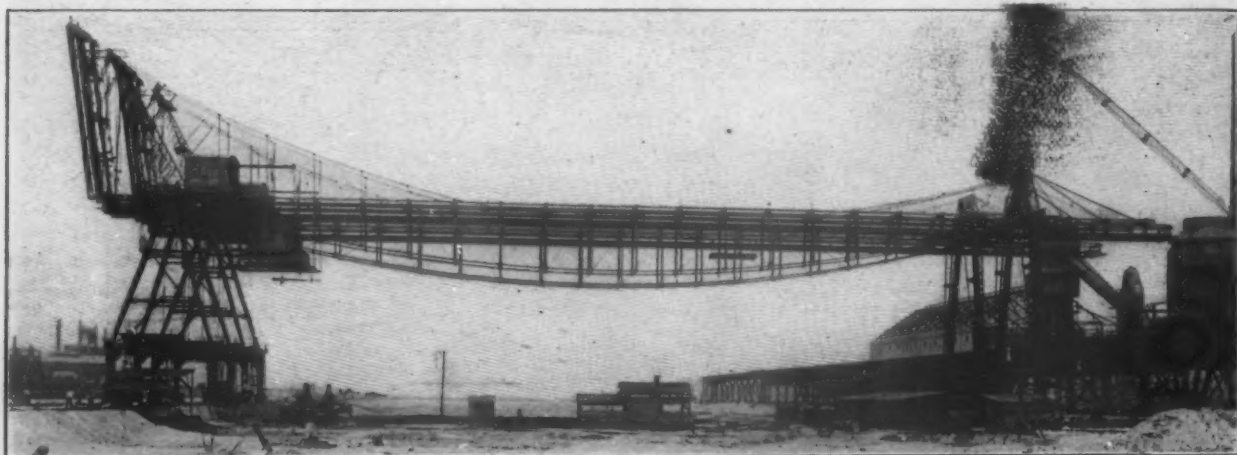


Fig. 1.—Ore Yard of the New Blast Furnace Plant of the Iroquois Iron Company, South Chicago, Ill.

must include cost sheets that compare favorably with other lake port furnaces.

Aside from proper general equipment, two advantages in particular were essential to the economical production desired: ownership by the furnace of the ore it used so that, if necessary, it could be charged into the pig iron cost on the basis of mining and transportation charges only, and facilities for the direct mechanical handling of raw materials into the furnace. The first consideration has been solved through the development of this company's Cuyuna range properties, thus augmenting previous holdings and securing an adequate supply for the future. The second has been made possible by gaining title through legislative action to many acres of submerged land along the shore of Lake Michigan, beginning at and extending south from the Calumet River. Here, by filling in and driving piles, a plant site has been wrested from the lake, presenting natural advantages in strict accordance with engineer's specifications.

In addition to the question of cost, the growth of Chicago as a consuming center for chilled basic pig and malleable as well is obviously important. At present the Chicago furnaces have little or no basic to sell. The new plant is therefore equipped for ladle pouring and for casting in a pig machine. To thus create a plant that would meet the above requirements was to create also the possibility for every expansion for which such a blast-furnace installation might be the nucleus. In what has already been accomplished by the Iroquois Iron Company in the

from 10 to 14 ft. of water to a total depth of 40 ft., has been extended. Under date of April 22, 1911, an interesting account of the filling in of the site and the building of the concrete foundations was presented in the Engineering Record. The rapidity with which the Great Lakes Dredge & Dock Company proceeded with this work is of especial interest.

### The Ore Dock and Ore Yard

The plant is laid out on lines parallel to the Calumet River, along which the ore dock is built. The sequence of arrangement in a direction away from the river shows the ore yard, ore, coke and stone bins, stacks and cast houses, dust catchers and cleaners, stoves, boiler house, power house and pig machine. The future expansion of the blast-furnace plant will be along these parallel lines, to the east, which is in the direction of the lake.

The concrete ore dock is 1200 ft. long and is set back 52 ft. from the line of the former government pier so that boats may lie at the dock without obstructing the river channel. Before the old government dock was removed the piles and sheeting for the concrete construction were driven. The outer shear legs of the ore bridges run on two tracks 32 ft. apart, between which two additional standard gauge tracks are laid for the direct loading and unloading from boat to cars and to the storage yard or vice versa. The two piers supporting the traveler tracks are tied together by 2-in. rods, spaced 5 ft. centers, which run back 142 ft. to a deadman. The storage yard is 1200 ft. long and 284 ft. wide with an effective height under



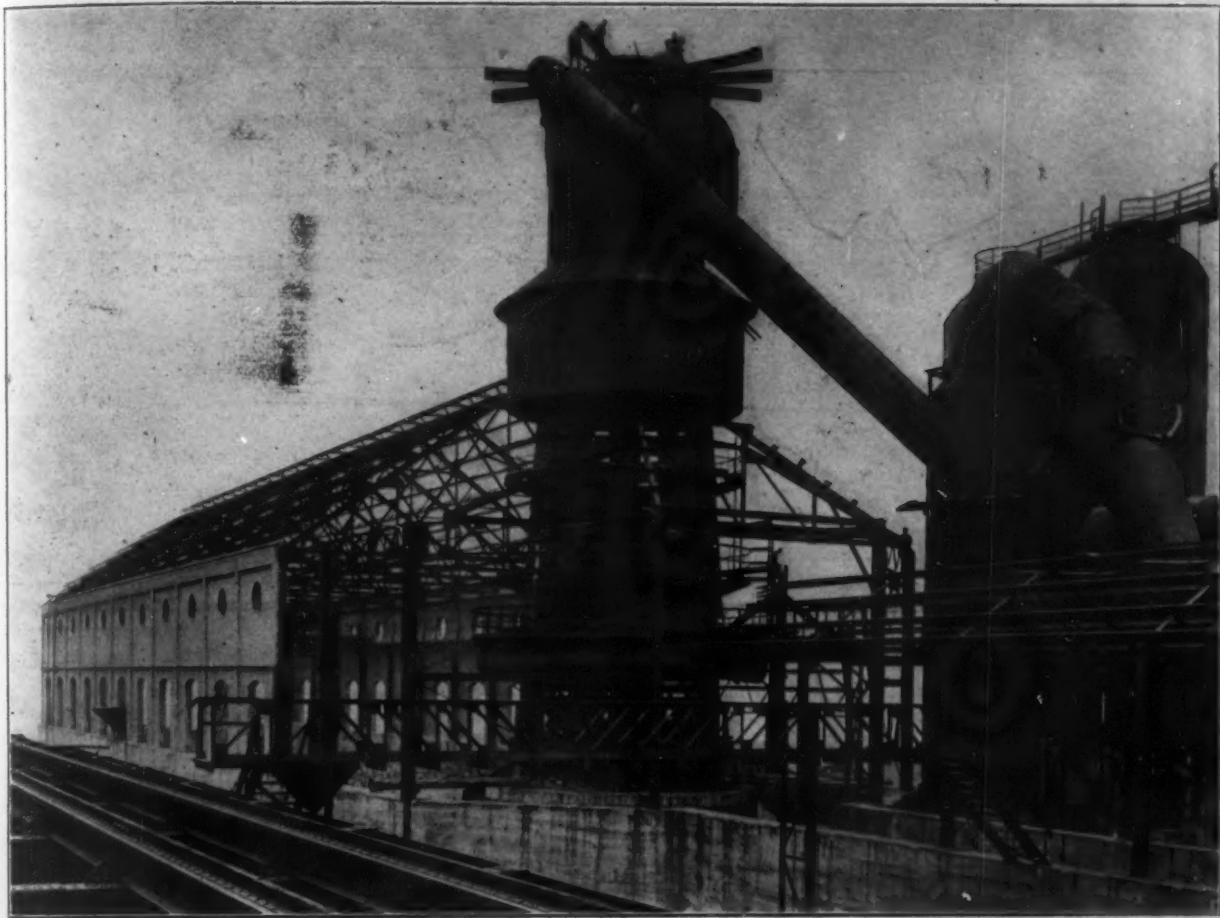


Fig. 2.—View of One of the Iroquois Iron Company's New Blast Furnaces.

the ore bridges of 72 ft., affording estimated storage capacity for 500,000 tons.

The ore yard, Fig. 1, is spanned by two  $7\frac{1}{2}$ -ton Brown electric "man trolley" bridge tramways. These bridges have one span of 300 ft. between shear legs, a cantilever projection of 51 ft. 9 in. over the ore bins and an apron extension at the water end of 84 ft. The trolley travel over the entire length is approximately 400 ft. The bridge is designed to carry the man trolley and a maximum load suspended from it of about 15 tons. The trolley is arranged to travel along the tramway at a speed of 900 ft. per minute and to hoist the full load in the grab bucket at the rate of 225 ft. per minute. The travel of the bridge along its track is rated from 50 to 75 ft. per minute. The bucket is of the recently improved Brown two-rope type with a capacity of 110 cu. ft. and an over-all spread of approximately 17 ft. 6 in.

The ore bin, transfer car and charging larry installations are generally similar to the equipment at the Gary plant of the Indiana Steel Company except in the extent of the plant. There are two sets of ore, coke and limestone bins of the Brown parabolic type, each set consisting of eight panels about 14 ft. long, making the total length of each set 112 ft. The bins have capacity sufficient for 24 hours' run of the stacks. Two parallel standard gauge tracks are carried on the bins, the approach being over a steel trestle built on a 420-ft. radius curve and with a grade of  $1\frac{3}{4}$  deg. At each panel point of the bins cross beams are provided, designed to carry the track stringers and so spaced as to carry a 60-ton ore carload. For the distribution of material along the bins a transfer car is installed, also built by the Brown Hoisting Machinery Company. This has a four-compartment hopper with bottom doors, mounted on a structural steel frame. It is electrically driven and controlled completely from the operator's cage at one end.

Attached to the bottom of each panel of the ore and limestone bins are two spouts and gates, or 32 in all. The 16 panels of coke bins are each equipped with one spout and gate, or 16 in all. Each of these gates is connected up so that it may be operated from the larry cars. Three 120-cu. ft. electrically operated larries run on a track suspended under the bins. Each larry is equipped for oper-

ating one 120-cu. ft. bucket which is carried on a special weighing mechanism supported on the steel framework of the larry. The speed of these larries with full load is from 600 to 900 ft. per minute. A more complete description of this type of installation may be found in the description of the Gary plant in *The Iron Age* of January 6, 1909.

#### Blast-Furnace Stacks and Stoves

The engineering work of this plant is in charge of the office of Julian Kennedy, Pittsburgh, and the stacks and



Fig. 3.—The Rust Vertical Boilers in the Iroquois Iron Company's Power Plant.

stoves will be recognized as his design. The stacks have an approximate capacity of 300 tons daily and are 21 ft. by 85 ft.  $4\frac{1}{2}$  in. The hearth is 14 ft. in diameter at the cinder notch and 14 ft. 5 in. at the iron notch, with a height of 10 ft. The hearth is carried in the usual firebrick and concrete foundation, Fig. 2. The mantle rests on 6 cast iron

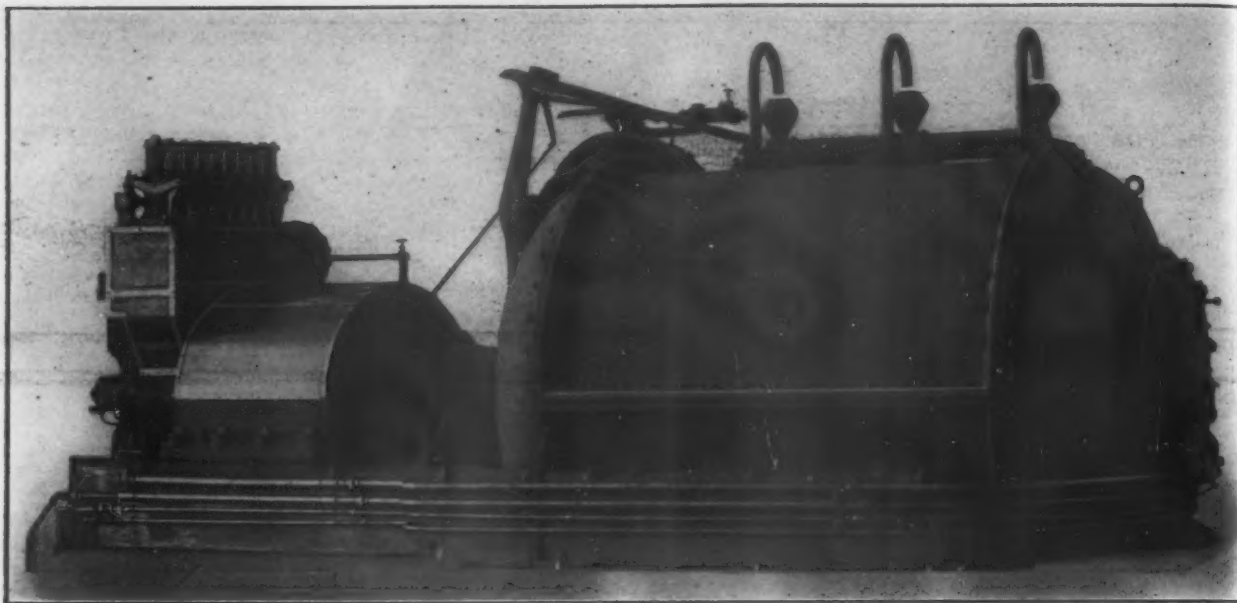


Fig. 4.—General Electric Turbine Blowing Engine in the Iroquois Iron Company's Power House.

columns imbedded in concrete to a depth of 5 ft. 3 in. and tied together with steel rods in a circle 25 ft. 3 in. in diameter. From hearth to sidewall the height of the boshes is 11 ft. 3 in. There is no external cooling of the hearth or shell. The hearth is inclosed in  $4\frac{1}{2}$ -in. steel plates, into which cooling pipes are cast. In the boshes are eight rows of cooling plates—in the first row 22, in the second 12, in the third 12 and in the balance 18. In the side walls for a height of 27 ft. above the boshes are 9 rows of cooling plates. Above this the walls are not water cooled. The sidewall lining just above the mantle is  $16\frac{1}{2}$  in. thick; above the cooling plates  $19\frac{1}{2}$  in., and at the top 24 in. Openings are cut in the shell and the brick lining is arched for each cooling plate so that it may be easily removed. Galleries are built around the sidewalls as shown in the illustrations, for

handling these cooling plates, and these galleries are covered with steel canopies which serve as a weather protection. Hot air pipes for the prevention of freezing are carried under the canopies.

The furnace has a closed top with no explosion doors. The top casting into which the hopper fits, in addition to being carried on the shell, is inclosed in concrete. The inside diameter of this casting is 10 ft. 4 in. The hopper diameter at the bottom is 9 ft. 3 in. and the bell at the bottom has a diameter of 10 ft. 2 in., and is operated hydraulically. The lining of the furnace just below the bell, where the charge strikes, is protected by heavy plates cast in segments to make a throat 14 ft. in inside diameter for a depth of 6 ft. 6 in. The two downcomers are taken off from four openings from the top, each opening 3 ft. in

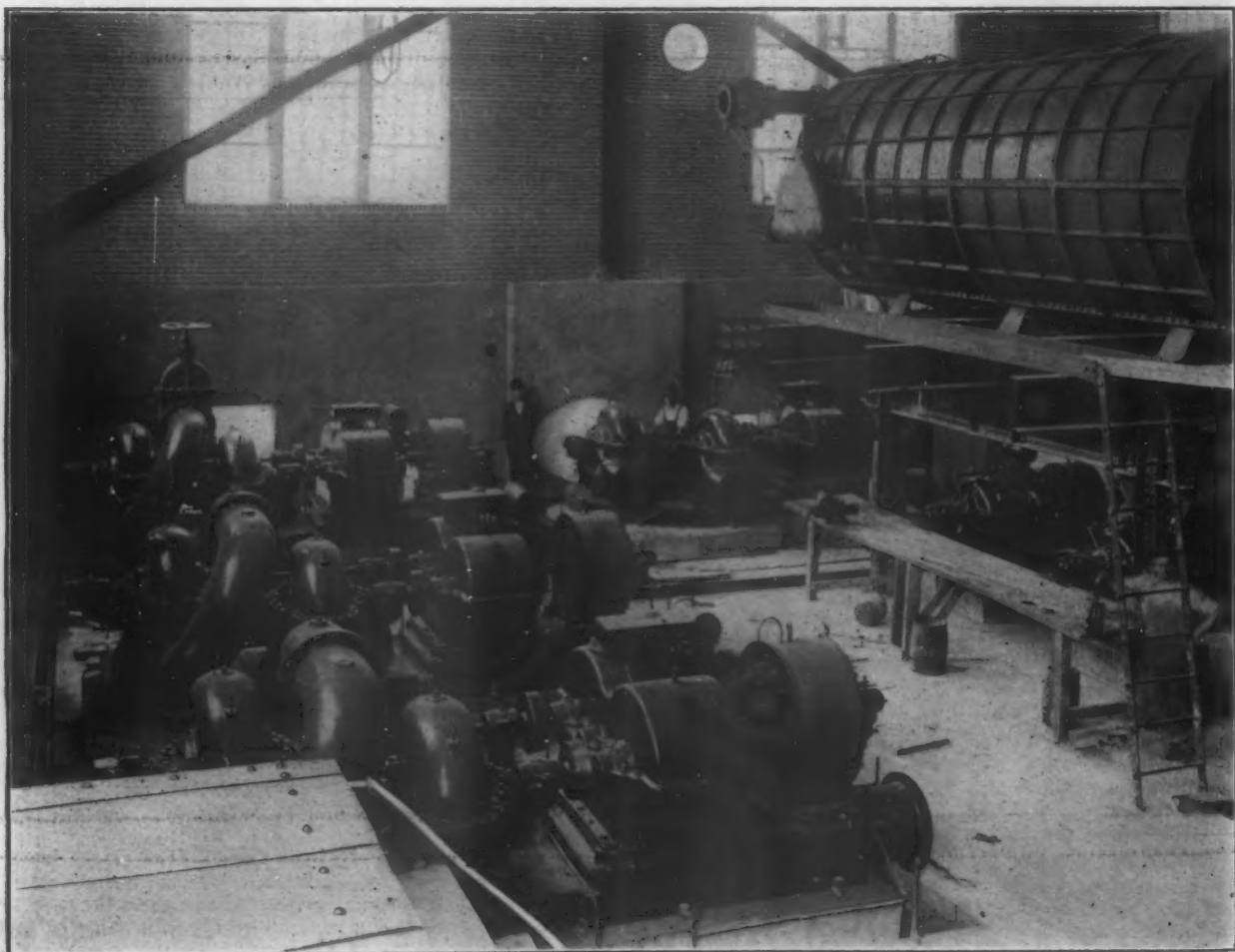


Fig. 5.—The Pump Installation in the Iroquois Iron Company's Power House.



diameter, enlarging at the second elbow to 3 ft. 6 in. There are six tuyeres and the inside diameter of the bustle pipe is 24 in.

The furnace skips are operated in balance from the larry pit by hydraulic control. The hoist houses are located between the furnaces and the stoves, and ordinarily they are not entered except for oiling. The hoist was built by the Otis Elevator Company. Provision has been made so that, if the control of the hoist from the larry pit should fail connection can be cut off and the hoist operated by means of a hand lever in the hoist house.

The gas cleaning equipment consists of a dust catcher and four centrifugal gas cleaners for each stack. The dust catcher is of the baffle plate type, the diameter inside of the shell being 12 ft. 6 in. and height over all 55 ft. The foot valve is 10 ft. 3 in. above the surface level and the dirt can be spouted directly into cars. The gas is then carried through a 7-ft. main and distributed to a set of four gas cleaners of novel design. These are spaced 9 ft. center to center, and 13 ft. 6 in. on either side of the center line between the furnaces. The gas on entering the cleaner through a nozzle in the side near the top impinges against an internal circular throat concentric with the outside shell. The gas is given a circular motion in driving around the outside of this throat and is broken up in its passage downward by the many ribs with which the throat casting is joined to the outside shell. Below the throat casting is a circular ribbed baffle, which again deflects the gases. The centrifugal action throws the dust to the outside and the gases pass up through the center and out through the top into a manifold for delivery to the stoves and boilers.

There are eight stoves, four for each furnace, with a self-supporting steel stack for each set of four stoves. The stoves are of the two-pass type, 22 ft. by 96 ft. 4½ in. They are somewhat unique in having two chimney valves, the intention being to avoid shutting down the stove when a chimney valve requires repairing. In the erection work, two stack derricks were used mounted on rollers, so that they can swing in a complete circle around the stack, covering an area including the engine house on one side and the furnaces on the other. The convenience of this overhead handling is apparent.

#### The Power Plant

Steam for the power plant is generated in a battery of 13 Rust vertical boilers developing an aggregate of 7,000 h.p., Fig. 3. The boilers are equipped to burn blast-furnace gas regularly, but they may also be hand fired with coal. A separate gas header is brought down for each pair of furnaces and is carried on a dust leg. These headers divide so that each boiler may be independently controlled and without removing the gas burner from the firebox.

The power house is a steel-frame brick building, 54 x 220 ft. In addition to the turbine blowing engines mentioned above, one of which is shown in Fig. 4, there are installed here two Epping-Carpenter Company 19 x 34 x 4½ x 24 in. hydraulic pumps for operating the pig breaker located in the cast house of furnace D. These pumps yield a pressure of 40 lb. per sq. in. and have been tested up to 5000 lb. As illustrated, Fig. 5, the lift against which the service pumps must operate is reduced by placing them in a large pit at the west end of the power house. Water is brought to the power house from the intake in the Calumet River through a 60-in. cast iron pipe and the outgoing return is through a 60-in. brick conduit. The slope of these pipes is 2 in. in 100 ft. in the direction of the flow. The service and cooling water pumps as well as the condenser and feed water pumps are of the De Laval steam-turbine-driven centrifugal type. Three sets are used for general service. Two of these are connected in series, and they are rated to deliver 7000 gal. per min. against a head of 110 ft., operating at a speed of 885 ft. per min. The turbines operate on steam at 80 to 150 lb. pressure. The third set is used as a spare set and is connected up with a gate valve so arranged that it can be operated in either series or parallel and be cut in on either the service or condenser line. Its rating in series is the same as the other two and in parallel it is limited to a head of 55 ft. The fourth set is connected in parallel and will deliver 8050 gal. per min. at a speed of 900 r.p.m. against a head of 35 ft. It is used as a condenser pump for the barometric condenser, which stands just outside the power house.

The boiler feed pumps consist of two sets of centrifugal pumps, turbine driven, rated to deliver 635 gal. per min. at a speed of 2850 r.p.m. against a pressure equivalent

to a head of 465 ft. or approximately 200 lb. The hydraulic pumps and accumulator for operating the furnace bells are also placed in this pit. The pumps are two Smith-Vaile type built by the Platt Iron Works, 10 x 2½ x 12 in., and the accumulator was furnished by R. D. Wood & Co., Philadelphia. A Cochrane feed-water heater is installed and the dry air pumps for the condenser are two in number, with 18 x 36 steam ends and 34 x 36-in. air suction cylinders, built by the Mesta Machine Company, Pittsburgh. The electric plant consists of two 600-kw. turbo-generators for the ore bridge and larry operation, and for the direct-current cranes a motor generator set consisting of a Westinghouse 40-h.p. 220-volt 3-phase 60-cycle motor and a 225-kw., 220-volt Crocker-Wheeler generator. A 10-ton Whiting crane traverses the power house. The water system includes a Kennicott water softening plant and standpipe.

Particularly for the making of chilled basic iron, a pig casting plant has been included in the installation, and one of the cast houses, that for furnace C, has been arranged exclusively for pouring in ladles. The west stack is known as C and the east furnace as D, the two stacks at the old plant being known as A and B. Cast house C is 69 x 132 ft., measuring from the center of the furnace and from center to center of columns. For the easier approach of the ladle tracks on each side, this cast house stands at an angle of 3½ deg. from the line of the furnaces. Cast house D is 69 x 249 ft. Iron can be poured in ladles here also, but for the most part the iron will be cast in the sand. In this connection a Brown pig-breaking machine is installed at the east end of the cast house and a 10-ton crane traverses the building.

The pig-casting ladle house is 65 x 138 ft. and carries a 100-ton crane. The pig-casting machine was furnished by Heyl & Patterson, Pittsburgh, is electrically operated and has a ladle-tilting cradle of recent type. The distance from the center line of the ladle house to the center of the pig loading tracks at the discharge end of the casting machine is 163 ft. 8 in.

From the face of the concrete dock to the center line of the blast furnaces the distance is 437 ft. From the furnaces to the center line of the pig casting house the distance is 472 ft. 6 in. From center to center of furnaces is 165 ft. The stoves are 106 ft. from the furnaces and the power house is 113 ft. south of the stoves.

#### Selling Arguments for Tin Roofing

Under the above title the N. & G. Taylor Company, Philadelphia, has issued a publication of 78 pages which is practically a treatise on the subject of tin roofs. It gives numerous arguments in compact form for use in pushing the sale of tin roofing. These arguments are presented under several heads as follows: Durability, time tried and long established, easily applied, adaptability to any service, moderate first cost, low cost of maintenance, re-use or second hand value, easily and quickly repaired, neat appearance, loses nothing in appearance with age, not affected by heat or cold, gives protection against lightning, incombustible or preventing the spread of fire, and weather proof. Under each of these headings numerous illustrations are given of structures roofed with tin, and pertinent testimonials are presented for the purpose of making the application of the idea a practical one. Instructions are given in laying a tin roof and numerous tables are included which are of practical value to the tin roofer and others engaged in supplying tin plates for this purpose.

#### New Bethlehem Blast Furnace Almost Completed.

At the east end of the blast-furnace department of the Bethlehem Steel Company, South Bethlehem, Pa., one modern blast furnace is being erected and almost completed. It is 22 ft. in diameter in the bosh and 90 ft. high, with a capacity of 450 tons of pig iron per day. This furnace is equipped with an electric skip hoist and supplied with five hot-blast stoves of the McClure type, each 22 ft. in diameter and 100 ft. high. It will be ready to be put in blast in a week or two. After it shall have been put in operation the company's blast furnace plant will comprise a total of seven furnaces with a capacity of 900,000 tons of pig iron per year. Practically all of the hot metal from the blast-furnace department is taken directly in 40-ton ladles to open-hearth department No. 2 (Saucon plant).

## May Iron and Steel Exports and Imports

The report of the Bureau of Statistics of the Department of Commerce and Labor for May shows a material decrease in our iron and steel exports and a slight increase in imports as compared with the April figures. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, was \$20,616,795 in May against \$24,917,056 in April, while the value of similar imports in May was \$2,736,149 against \$2,439,885 in April.

The exports of commodities for which quantities are given totaled 173,920 gross tons in May against 227,832 tons in April and 134,703 tons in May, 1910. The details of the exports of such commodities for May and for 11 months of the fiscal year ended with May, compared with corresponding periods of the previous year, are as follows:

Commodities.	May		11 months ended	
	1911 Gross tons.	1910 Gross tons.	1911 Gross tons.	1910 Gross tons.
Pig iron.....	6,274	7,814	145,064	1,207,410
Scrap.....	10,351	3,687	53,764	14,508
Bar iron.....	1,457	2,057	16,675	14,644
Wire rods.....	2,224	1,834	17,029	22,443
Steel bars.....	11,244	8,201	111,347	81,062
Billets, ingots and blooms.....	21,520	180	167,718	49,313
Steel rails.....	36,900	35,516	359,157	344,186
Iron sheets and plates.....	8,453	8,834	92,610	87,893
Steel sheets and plates.....	14,304	13,271	182,441	128,924
Tin and terne plates.....	4,695	1,461	27,182	10,918
Structural iron and steel.....	18,450	15,750	156,331	104,472
Barb wire.....	7,975	7,349	75,459	67,853
All other wire.....	10,073	8,236	100,067	73,013
Wire nails.....	3,214	4,996	46,851	34,093
Cut nails.....	1,047	1,031	9,504	8,449
All other nails, including tacks.....	1,236	1,185	11,289	7,666
Pipe and fittings.....	14,503	13,301	164,010	150,779
Totals.....	173,920	134,703	1,736,498	2,407,626

The imports of commodities for which quantities are given totaled 23,375 gross tons in May as compared with 22,390 tons in April and 42,537 tons in May, 1910. The details of such imports for May and for 11 months of the fiscal year ended with May, as compared with the corresponding periods of the previous year, are as follows:

Commodities.	May		11 months ended	
	1911 Gross tons.	1910 Gross tons.	1911 Gross tons.	1910 Gross tons.
Pig iron.....	12,273	21,405	187,095	223,606
Scrap.....	2,601	3,253	24,196	116,370
Bar iron.....	2,850	4,304	27,500	29,963
Billets, bars and steel forms n.e.s.....	2,029	3,885	36,188	34,797
Sheets and plates.....	196	460	3,454	6,424
Tin and terne plates.....	2,199	7,086	40,874	63,553
Wire rods.....	1,227	2,174	16,627	14,040
Totals.....	23,375	42,567	335,934	488,753

The imports of iron ore in May were 217,467 gross tons against 133,900 tons in April and 240,833 tons in the month of May, 1910. The total importations of iron ore for 11 months of the fiscal year ended with May were 2,015,337 gross tons, against 2,188,261 tons in the corresponding period of 1910. Of the May imports of iron ore 124,025 tons came from Cuba, 35,899 tons from Sweden, 28,131 tons from Spain, 21,980 tons from Newfoundland and 7432 tons from Canada.

The total value of the exports of iron and steel and manufactures thereof, not including ore, for 11 months of the fiscal year ended with May was \$210,415,298 against \$162,629,982 in the corresponding period of 1910. The total value of the imports of iron and steel and manufactures thereof, exclusive of ore, for 11 months of the fiscal year ended with May was \$31,427,331 against \$35,434,273 in the similar period of 1910.

The Pittsburgh Drafting Company has been formed by George K. Smith, formerly mechanical engineer of the Bell Telephone Company, Pittsburgh, and also with the Western Electric Company, New York City. Its location is at 1216 Fulton Building, Pittsburgh, its specialty being the development of new mechanical propositions, machine design, patent drawings, sketches, shop drawings, etc.

The Clarion Water Company, Clarion, Pa., has awarded the contract for a steel settling tank to the Hammond Iron Works, Warren, Pa. Chester & Fleming, Union Bank Building, Pittsburgh, are the consulting engineers.

## The American Blower Company's Monthly

To keep in closer touch with and to improve the efficiency of its selling organization the American Blower Company, Detroit, Mich., has commenced the publication of a monthly that will be issued for confidential circulation among its branch managers, about 50 in number. Each of these managers will contribute a news letter for each issue, in which he will give information about business conditions in his territory, prospects, unclosed contracts, and other matters of interest. The publication will also include technical information about fan performances, records of tests, detailed descriptions of installations that are out of the ordinary, information relating to the new use of blowers and other matters of interest to the selling force. Up to this time much of this information has been disseminated among the branch managers only once a year at their annual meeting. The company has adopted the policy of refusing to countenance a complaint without a suggestion for a betterment. To keep this firmly before the minds of the branch managers, the following precept is to appear in large type on the back inside cover of each issue of the pamphlet: "He who criticises, be he ever so honest, must suggest a practical remedy or he soon descends from the height of a critic to the level of a common growler." The publication is very neatly gotten up, in form quite similar to a small house organ. It has been named the "Informant."

## The Brass Manufacturers' Meeting

The National Association of Brass Manufacturers held a very successful meeting at the Hotel Ponchartrain, Detroit, Mich., June 27. Among the topics discussed were the standardization of measures and openings; the eradicating of old and obsolete threads, and legislation recently enacted by the several States, and especially the recent law passed in Ohio, Senate Bill No. 479, which will materially alter existing conditions and tend to bar the use of certain types of goods. Other topics were shipping classifications, freight rates, labor conditions and modern methods of producing goods. The association will next meet in Cleveland, Ohio, September 20.

**Sampling and Analyzing Gases.**—The methods of sampling and analyzing gases as practiced by the United States Steel Corporation are described in a 36-page pamphlet prepared by the Chemists' Committee, J. M. Camp, Carnegie Steel Company, Duquesne, Pa., chairman. Aside from the economic value of the suggestions and information given, the appearance of such a publication is a commentary on the importance placed on accurate knowledge of the composition of gases, which, with the rapid increase in the use of the internal combustion engine, using blast furnace or producer gas as a fuel, has rendered expedient close watchfulness on the efficiency of the different parts of the modern plant. Views of the sampling and analyzing apparatus and a description of its construction are given, as are also the determinations made in connection with both blast furnace gas and producer gas, and a useful table of factors for correcting volumes of gas to standard conditions.

The Helwig Mfg. Company, St. Paul, Minn., is making a pneumatic staybolt clipper which is steadily increasing in popularity for the rapid, efficient and economical manner in which it cuts off staybolts. It not only cuts bolts of any length, but crown stays as well, and of the proper length for riveting without injury to the thread or sheet. It cuts off the bolt with a smooth, soft straight cut, leaving it as tight in the sheet as when first put in. The machine is made in two sizes, the larger weighing 210 lbs. and cutting off staybolts up to 1½ in., while the smaller weighs 170 lbs. and cuts off 1¼ in. and smaller. It is claimed that the device is convenient to handle, easy to operate and cheap to maintain.

The McDermott Tool Works, Martin's Ferry, Ohio, manufacturer of iron and steel forgings, oil well supplies, etc., is placing on the market a machine for galvanizing sheets of standard widths, or will build special sizes to suit. The McDermott machine possesses some features which add to its life; for instance, the working parts of the machine are located above the metal line. Machines already installed are giving excellent satisfaction.



## An Interesting Crane Installation

### Standard Pipe Foundry Equipment

The six 10-ton electric traveling cranes and a special electric hoist, herewith illustrated, in the plant of the Standard Cast Iron Pipe & Foundry Company, Bristol, Pa., were installed by the Pawling & Harnischfeger Company, Milwaukee, Wis.

The traveling cranes, Fig. 1, have a lift of 40 ft. and a span of 51 ft. 10 in. The bridges are composed of riveted

operator to stop the bridge travel without reversing the motor, a control so complete that much time is saved. The builder in designing these cranes has sought to accommodate motors of different sizes for either direct or alternating current and to have each shaft accessible without disturbance to the other. The motors are designed with special reference to crane service and have a great overload capacity. The frames are of cast steel, and they are fitted with laminated poles. All field coils are energized with bronze bushed bearings for ring oiling lubrication. Each armature is removable from the spider on which the



Fig. 1.—An Installation of Six Pawling & Harnischfeger 10-ton Electric Traveling Cranes in a Pipe Foundry.

box-section fish-belly girders, tied at the ends with structural frames and riveted to form a one-piece construction in which the bridge is supported on four cast truck brackets closely fitted to each corner and having substantial through-bolts outside to outside of the brackets. The oil waste bearings with bronze boxes on each side of the steel-tired wheels are easily removable when the corner of the bridge is slightly wedged up. Extending the full length of the bridge on one side is a latticed auxiliary truss supported at each end on channel beams. Horizontal angle bars fastened to the bridge girder and truss carry the motor, gear case and cross-shaft boxes as well as the walk platform.

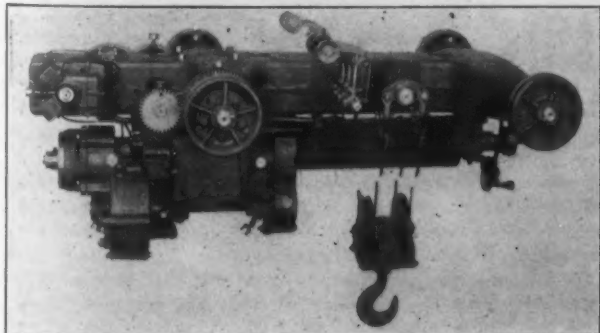


Fig. 2.—A Special Electric Hoist for Handling Cores and Pipes.

The operating cage, with controllers, marble switch-board and foot brake lever and connections, is suspended partly from the truss, usually at the end and clear of the inside of the girder, in order to allow the hook and cables to pass to their full travel. In this type of crane the cage may be located at any part of the span. Connection from the bridge motor brake to the foot lever enables the

punchings are mounted. Armature coils are form-wound and provided with ventilation to assure low temperature.

The controllers, located in the operator's cage, have the rheostat resistances banked in frames on which are mounted the circular heads that retain the reversing switches and connections. The operating levers have a forward and return movement which corresponds with the several directions of travel of the load hook, bridge and trolley. All connections are made with metal bars, securely bolted, yet easily disconnected for making repairs. The levers have an easy movement and short throw, the resistance being so arranged as to provide for the accurate motor regulation essential in good crane practice.

A limit or safety switch cutout device, attached to the drum shaft bearing box cap; has its trip nut traveling on a screw stud in a cap fastened to the end of drum shaft. The function of this device is to open the hoisting circuit when the bottom block reaches the safe limit of up-travel. In this operation the connections are so made that the lowering circuit is not broken, which allows of lowering the hook but makes it necessary that the operator throw in the safety switch in order to hoist. Machine cut steel spur gearing, all inclosed, is used throughout. Split bronze bushings set and doweled in bored pockets with bolted caps are accurately fitted for each shaft bearing.

Fig. 2 shows one of several special electric hoists of 3 and 6-ton capacity built by the Pawling & Harnischfeger Company for the Standard Company. It is operated with a double I-beam truck and is used for handling cores and pipe into and out of a tar bath. It is controlled from a pulpit and has a lift of 20 ft. and a spread of 4 ft. 2 in.

The Allegheny Steel Company, Pittsburgh, Pa., is doubling the capacity of its steel casting department, as well as making other improvements, to its plant at Brackenridge, Pa.

**S. DIECKHOFF & SONS,**  
Mechanical and Civil Engineers,  
PITTSBURGH, PA.

## Operation of Blast-Furnace Gas Engines

### The Experiences with Gas Engine Performance and Gas Cleaning Voiced at the Mechanical Engineers' Meeting

Valuable suggestions and interesting figures having to do with the application of the gas engine for utilizing blast furnace gas were given at the recent meeting in Pittsburgh of the American Society of Mechanical Engineers. They were made more or less informally at the time, and reference to them other than given in the report of the meeting in *The Iron Age* has been withheld until the figures and observations could have the stamp of authority which is now obtained through the secretary of the Gas Power Section of the society, George A. Orrok, of the New York Edison Company. One whole session of the Pittsburgh meeting was given over to gas power, and it was very largely occupied with the discussion of the large size gas engine and co-ordinate problems of blast furnace operation. Generous extracts from the discussion are as follows:

#### Satisfactory Results at Carrie Furnaces

R. H. Stevens said: At the Carrie furnaces we have four gas blowers of the Allis-Chalmers make. We have five electric engines, three of the Allis-Chalmers and two of the Bethlehem, all in operation. We have got quite a cleaning plant in this connection. The gas first goes through a Babbit impinging washer; from there through a fan into a screen, from the screen into the Theisen, and from there to the engine house. We get a total efficiency in the cleaning of over 99 per cent. We get down as low as 0.003 grain per cubic foot. Our engines are running along about 110 to 120 cu. ft. of gas per indicated horsepower, and they have the gas running from 85 to 90 B. t. u. per cubic foot.

We have operated from the time the engines were in shape to operate, at least from 95 to 98 per cent. of the time. This, however, was not required, as the demand was such that we only ran approximately about 90 per cent.

#### Amount and Condition of Gas Obtained

A. N. Diehl, of the Duquesne Works, of the Carnegie Steel Company, gave the following interesting information: We consume a pound of coke for about every 60 cu. ft. of air blown, and produce approximately 150,000 cu. ft. of gas per ton of pig iron produced, of which a loss of ten per cent. may be allowed for leaks. About 50,000 cu. ft. is used to heat the blast, and the remaining 85,000 can be used to produce steam or drive the blowing engines; any excess is available for other facilities.

The gas from the top of the furnace varies considerably in thermal value, as well as in temperature, moisture and dust content. The normal hydrogen is about 2 to 5 per cent., and carbon monoxide from 18 to 27 per cent. These figures are only normal; very often we have higher hydrogen and either higher or lower carbon monoxide. The dust will vary from one gr. per cu. ft. to 25 or 30 gr. in gas from a slipping furnace, and the moisture from 15 gr. to 35 or 40 gr. per cu. ft. The temperature of the top gas will vary from 250 deg. F., in a good working furnace, to 1000 deg. F., in a furnace working irregularly. The normal top temperature is about 500 deg. F.

#### Cleaning the Gas

The gas, after leaving the furnace, first passes through the dust catcher, where the heavy particles are deposited by their own weight, and also by the reason of the chamber being large enough to slow down the gas, thereby allowing some dirt to fall out.

A number of systems of gas cleaning have been proposed from this point. The gas may be caused to enter a chamber so designed that the velocity is greatly increased, and the gas and dust whirled rapidly to the circumference, where vertical Z bars are located to catch the dust and keep it from getting back into the gas. The dust falls into a pocket below, where it can be drawn off. The system referred to is the Brassert-Whitting type, as is used in the South Chicago plant of the Illinois Steel Company. It is desirable to get the dust out dry if possible, as it saves it for other purposes, as well as removing just that much material and heat from the scrubbers through which the gas will have to go.

There are different systems of preliminary or partial wet washing. In some cases the gas is passed through im-

pinging washers, where it is rapidly thrown on surfaces of water; in others the gas is sprayed, etc. None of these systems are very efficient unless used as an auxiliary to a cooling apparatus for the removal of the moisture, because even though the gas should be more or less purified regarding dust, the temperature is so great as to pick up moisture, and the good effect of the clean gas is destroyed by the excessive moisture absorbed.

In case the gas is to be cleaned, the scrubbers will do all that these cleaners will do, and a lot more in the almost complete removal of dust, as well as the removal of considerable moisture. In some installations, the gas is passed through baffle towers. The gas enters at the bottom of the tower and finds a tortuous way to the top. Water is run over these baffles and drawn off below. From the baffles the gas is passed through Zschocke tower washers, which have stationary sprays, located at the top of the tower, and having a succession of wooden grids over which the water flows, falling from one to the other. A number of installations use baffles and one or two Zschockes in series, then pass to Theisen horizontal washers for final cleaning.

#### Gas Scrubbing at Duquesne

At Duquesne, we have departed somewhat from this system and have got the best results by positive and repeated spraying, with a tower 76 ft. high, 12 ft. in diameter, having two main supplies for the water, one about 10 ft. from the bottom of the scrubber, the other about 40 ft. from the bottom. The water is fed, in each case, into a valve having a motor driven revolving core. One 5 hp. motor is required to drive four valves, that is, the valves for two scrubbers. The valves are located outside the scrubber, and have 12 openings which can be used. At present we are only using six, each having a 1¼-in. pipe connected to the discharge opening in the valve. These pipes run into the scrubber and are located in such a position as to spray the entire area. The nozzles on the end of the pipes are turned vertically and a screen is placed about 6 ft. above the nozzles. This screen breaks up the water into a fine rain or mist, thus exposing an enormous surface to the gas, allowing better contact and cooling.

The revolving core is designed to blank one opening, allowing the water to flow through the remaining five. It is evident that, by its revolution, each hole will be blanked in succession, causing a momentary suspension in the flow of water from this nozzle; the other five delivering their usual flow. The result is that momentarily an area of less resistance to the gas is offered, approximately equal to one-sixth of the area of the scrubber, and the gas will surge naturally toward this point. After the gas has surged over the dead nozzle, and is traveling upward through the scrubber at the rate of 4 ft. per second, the core passes the opening, allowing the water to flow once more at a velocity of about 60 ft. per second. The gas, being under control of this spraying and continually rising toward the top of the scrubber, is tending toward a spiral or helical course, which is effective. We have found that 15 r.p.m. is about the proper speed for the core.

The upper and lower valves, which operate on the same principle, are driven from one shaft, and so arranged that the sprays overlap. This scheme of washing gas was adopted on the basis of results obtained in scrubbers as originally operated with revolving spraying device located at the top. The water after leaving the top of the



scrubber, was deflected by the different velocities of the gas, so that a continuous varying regulation of the quantity of water, and speed of rotation, was required to maintain a uniform rain. In spite of the most careful regulation the column of gas surged from one side of the scrubber to the other, the column practically deflecting the drops of water. The water distribution was verified by numerous distribution tests, at different points in the scrubbers, 4 in. apart, covering the entire diameter, by means of a movable funnel.

Drain pipes from the bottom of the funnel were brought to the outside of the scrubber, where the water was collected in a standard measuring vessel, and the time taken for the water to fill the same. The channeling of the currents was determined by putting powerful incandescent lights and reflectors inside the scrubbers to note the action. The lights were so arranged that the inside of the scrubber could be seen through a corresponding door placed over one of the manholes. This channeling would tend to keep the gas and water from coming in close contact, which is further borne out by the accompanying tabular results of a test showing the difference of temperature of 18.3 deg. between the inlet water and the outlet gas, against 4.2 deg. on positive spraying under the same conditions, except that 3000 cu. ft. more gas per minute passed through the latter scrubber. The No. 4 scrubber was equipped with the motor driven positive spraying valve, and the No. 8 scrubber with spray pipe and screens at top.

Test No.	Grains per cubic ft.	
	No. 4.	No. 8.
121	0.21716	.....
122	0.19695	.....
123	0.26964	.....
124	0.26312	.....
116-A	.....	0.34640
117-A	.....	0.33208
118-A	.....	0.27540
119-A	.....	0.35895
Dust at 60 deg. F and 30 in. Mercury		
Average.. 0.2367		
Temperatures No. 4 scrubber.		Average.. 0.2367
Inlet water.	Outlet gas.	
76.0	78.6	79.0
76.0	81.4	78.5
77.4	79.4	79.0
74.0	78.5	78.9
74.0	77.1	79.0
Aver. 74.8	79.0	78.8
Aver. difference, 4.2.....		18.3
Average gas per min. through scrubber No. 4.....		25,704 cu. ft.
Average gas per min. through scrubber No. 8.....		22,701 cu. ft.

Average Performance of the Scrubbers

Our object was to establish a condition of intimate contact between the water and gas, and this is shown by the temperature of the gas entering 350 to 400 deg. and coming out at the top, at about 4 to 5 deg. above the temperature of the cooling water. The upper part of the scrubber is sufficiently large to allow any mechanically carried water to fall out before going farther. Moisture tests, taken on the connecting line, from the scrubbers to the clean gas main, show the moisture in the gas to be on an average of 1/2 grain per cubic foot above the saturation point at the temperature of the gas. Each scrubber will handle 25,000 cu. ft. of gas per minute with a water consumption of about 815 gal.

This will give 36.8 cu. ft. of gas per gallon water used. The gas enters, from an average of a large number of tests, with 3 gr. of dust per cubic foot, at an average temperature of 350 to 400 deg. The gas in the main delivering to the stoves and also to the Theisens, contains 0.19708 gr. per cu. ft. This figure covers an average of 150 tests during the past year. We have noticed that the gas delivered to the stoves will show traces of moisture when the temperature of the air is less than 5 deg. higher than the temperature of the gas. If the temperature rise is greater, we have no deposition, showing that the gas is comparatively dry.

The gas after leaving the Theisen, contains an average dust content of 0.00902. This is an average of about the same number of tests mentioned before. The capacity of a Theisen is 14,000 cu. ft., although more can be put through. The engine builder's specification, as regards dust in the gas, is 0.025. The Theisens consume 1 gal. of water per 56.1 cu. ft. of gas cleaned.

The gas cleaning plant consists of nine tower washers for the rough cleaning. This makes a scrubbing capacity of from 250,000 to 275,000 cu. ft. of gas per minute, when the entire plant is in operation. The gas is delivered to the scrubbers in a brick lined gas main 8 ft. 6 in. in di-

ameter, and afterward goes through a 10 ft. 6 in. unlined, riveted and calked main, extending to the fans. The gas is passed only through one scrubber, then taken through a fan which had been provided, but is not in use at present. From the fan it is passed through a spiral dryer, or separator, which will tend to remove the mechanically carried moisture picked up in the fan, and any dirt which might be thrown out in its path through this spiral.

Handling the Gas

There are four fans rated at 84,000 cu. ft. of gas per minute capacity, which are driven by a 200 hp. motor. The reason for not using the fans is that we found by backing up the pressure in the dirty gas main we can obtain sufficient pressure to drive the gas to the point of combustion.

The gas is taken from the clean gas main, which is 8 ft. in diameter, by the Theisens, each running 375 r.p.m. and driven by 150 hp. motor. It then passes through another spiral dryer into a 7 ft. 6 in. refined gas main, leading to the gas engines.

The water for the scrubbers is taken from the main pressure system and increased 10 lb. by means of two De Laval centrifugal lifting pumps. The dirt and water from the scrubbers is collected in a central sewer, and run into a settling basin, provided with baffles which will allow the dirt to settle so that it can be recovered and also so that the water will be sufficiently clean to go into the river. We catch an average of 65 per cent. of a car load of dirt in the settling basin per day. The settling basin is divided into two parts, so that when one side is filled the water can be diverted to the other, allowing the first compartment to be cleaned.

The gas, after leaving the Theisens, passes into the engines through a small gasometer. The object of this gasometer is to reduce the pressure to about 2 in. before delivering it to the mixing chambers of the engines. The gasometers are about 4 ft. in diameter and about 4 to 5 ft. high. We do not have a large gasometer such as has been used in a number of the plants.

Performance of the Gas Engines

The gas engine equipment consists of two power engines and four blowers. The engines drive 2000 kw. Crocker-Wheeler generators, delivering alternating current at 6600 volts. The blowing engines operate Slick blowing tubs and are guaranteed to deliver 33,000 cu. ft. of air at 62 r.p.m., against 22 1/2 lb. pressure. The cylinders are 42 x 60 in. with inlet and outlet valves on the side, the total horsepower of the engine being given by the builders as 3600, using furnace gas containing 80 B. t. u. per cu. ft., and calculated on a mean effective pressure of from 55 to 60 lb. This mean effective pressure is far lower than what we have got in some tests, but in most tests the thermal value of our gas has been between 90 and 100 B. t. u. The outlet and inlet valves are operated by noiseless cams, the inlet valve being closed by a heavy spring, the outlet valve being closed by compressed air at about 25 to 30 lb. pressure. The engines are of constant mixture and variable-compression, twin-tandem, four-cycle type.

We have a forced feed lubricating system operated by means of Richardson oil pumps. The oil is forced into the cylinder and packing cases. The packing requires a feed of one drop of oil for every other revolution of the cam shaft, while the feed of the cylinder requires one drop every four or five revolutions of the cam shaft. The engines require about from 6 to 8 gal. of oil every 24 hr. They are cooled by means of water circulation, and require about 6 to 7 gal. of water per horsepower hour. The temperature of the ingoing water is from 50 to 75 deg.; the outgoing from 120 to 160 deg. About 20,000 gal. of water per hour is being used.

The average thermal efficiency for the last six months of 1910 was 24.15 per cent. on an average load of 1372 kw., and gave an average B. t. u. per indicated horsepower of 10,529. This was only 55 per cent. of the rated full load. At a nearer rated full load the gas power engine showed the following as an average: Average load 3030 b.h.p.; percentage of rated full load 84 per cent.; B. t. u. per i.h.p. 8244, or a thermal efficiency per i.h.p. of 30.9. Rated full load 3600 b.h.p. The maximum load noted on the engine, lasting continuously for a period of three minutes, was 3300 kw., no drop in speed being noted at this load. This load would correspond to 4807 b.h.p. or 5741 i.h.p. giving an apparent overload of 33 per cent.

above the builders rating and a mechanical efficiency of 83.7 per cent. at this total load. This, however, was all due to the increase in B. t. u. value of the gas, but shows the engine to be capable of more power if the conditions are favorable.

#### Deposits in Gas Engines

The engines are only cleaned about once every two months, and about 4 or 5 lb. of dirt scraped off the cylinder and piston heads. We have not as yet had to stop an engine, especially to clean the cylinders and pistons, but do so when we stop to clean the cooling jackets, which become clogged up with mud and leaves, due to the poor condition of our river water. The dirt removed from the cylinders and piston heads is a whitish deposit which seems to be held in position by carbonized oil. The cylinders are blown off about once every 6 hr., allowing two exhaust charges to pass through a blowing off port located at the bottom of the cylinder.

An analysis of the whitish deposit formed on the cylinder and piston heads is as follows:  $\text{SiO}_2$ , 18.40;  $\text{Mn}_2\text{O}_3$ , 2.40;  $\text{Al}_2\text{O}_3$ , 15.55;  $\text{CaO}$ , 12.20;  $\text{MgO}$ , 1.68;  $\text{Fe}_2\text{O}_3$ , 4.71; ignition loss, 2.17 and alkalis, 42.89.

The dust coming from the scrubbers and collecting on the sampling pipe is generally of a steel gray color, shading to red. The weight of dust per cubic foot seems higher in the gray than it does in the red samples. The deposit seems to carry through the entire system and is seen at the top of the stoves and at the top of the boiler stacks. A determination was made to find what quantity passed through the system without being deposited, and was found to be 25 per cent. of the dust recorded at the gas cleaning plant. In the bottoms of the stoves and in the combustion chambers of the boilers, this white deposit, which appears as an impalpable powder, collects, and has the following analysis:  $\text{SiO}_2$ , 22.80;  $\text{Fe}$ , 6.00 ( $=\text{Fe}_2\text{O}_3$ —8.57 per cent.  $\text{Mn}$ , 1.50) ( $=\text{Mn}_2\text{O}_3$ —2.09 per cent.);  $\text{Al}_2\text{O}_3$ , 15.73;  $\text{CaO}$ , 21.42;  $\text{MgO}$ , 2.50;  $\text{K}_2\text{O}$ , 20.90; ignition loss, 6.08.

#### Experience at McKeesport

Alex. L. Hoehr, steam and hydraulic engineer of the National Tube Company, discussed some details of the gas cleaning and gas engine plant of the National Tube Company at McKeesport, Pa. The plant contains two Allis-Chalmers twin-tandem, four-cycle gas-engines, with cylinders 32 in. in diameter and 42 in. stroke. Each engine drives a 1000 kw. Crocker-Wheeler direct current generator of 250 volts at 110 r.p.m. The first engine was started with the load on October 27, 1907, and the second on September 23, 1908. They operate in parallel with four Allis-Chalmers steam units driving 624 kw. generators. Many difficulties were encountered in starting the plant, but to-day and for many months past the gas engines have operated as regularly as any other unit on the plant.

The load factor for seven months of this year beginning with June, averaged 81.6 per cent. The maximum was 86.06 per cent. in November and the minimum was 77.23 per cent. in July. The No. 2 engine ran 8014.5 hrs. out of a possible 8760.91 per cent. The maximum was 86.06 per cent. in November and the minimum 67.89 per cent. in August. There were six months when no delays were charged to the engine. The gas engines are operated on Sunday in preference to the steam units which are supplied by coal-fired boilers, and this helps to hold up the load factor.

The two engines use about 15,000,000 gal. of water per month, which amounts to 12.4 gal. per kilowatt hour or 61.9 gal. per 1000 cu. ft. of gas used. The jacket water is discharged at temperatures ranging from 120 to 140 deg. F., and no use is made of it at present except in winter when a part is further heated by passing through a coil in the exhaust muffler and is used to heat the shops.

#### Gas Cleaning at McKeesport

The blast furnace plant at McKeesport consists of four 500-ton furnaces producing Bessemer pig iron for the manufacture of tubular goods. The gas mains from these furnaces are all connected into one system. To this system is connected the main leading to the gas cleaning plant so that the surplus from any or all of the furnaces can pass to the gas engines. The arrangement of the dust catchers is different at each of the four fur-

naces, but includes in all cases a large dry dust catcher into the top of which the downcomer passes and from the sides of which, at various angles, pass gas mains to the stoves, boilers, etc. These branches are equipped with water seal valves so that they can be cut off from the system for repairs or other purposes.

Dry dust catcher No. 1 on the gas cleaning system is 35 ft. diameter inside the plates, and about 32 ft. total height. It has a  $4\frac{1}{2}$  in. brick lining throughout. Two 5 ft. diameter gas flues, which form the connection between the general gas system and the gas cleaning system, enter the dust catcher tangentially near the top, giving to the entering gas a rotary motion which lengthens the distance to be traveled between the inlet and outlet and also causes some centrifugal effect which aids in separating out the dust, which falls to the conical bottom and is kept out of the outgoing gas current by a series of baffle plates. A short distance above the tops of these plates and at the center of the dust catcher is the lower end of the 8 ft. diameter outlet flue which is supported by a series of diagonal rods running to the upper edge of the dust catcher. This flue passes up and out at the top where it makes a 90 deg. bend and crosses the mill yard to dry dust catcher No. 2, which it enters tangentially near the top, being reduced to 6 ft. diameter at the point of attachment for convenience of construction. This flue is not lined.

Dust catcher No. 2 is the same size and construction as No. 1 except that it is not lined and has but one inlet connection. These two 35 ft. diameter dry dust catchers and the connecting flue, 8 ft. diameter, were made large not only to reduce velocities so that the dust would settle out, but also to provide large radiating surfaces for the dissipation of heat which otherwise would have to be carried off by additional water supplied to the Zschocke washers. As the temperature of the gas leaving dust catcher No. 2 will run about 365 deg. F. it is evident that this dissipation has been accomplished. With two engines at full load, the velocity of the gas in the 8 ft. connecting flue will not exceed 135 ft. per minute. It should be explained here that this connection was designed for twice the engine capacity now in use, but even with this increase the velocity would be very low.

From the top of dust catcher No. 2 the gas passes into a horizontal overhead flue 8 ft. diameter, from which two vertical branches are taken, which act as supports and also as downcomers to deliver the gas into the lower portion of two Zschocke spray towers. These towers are each 14 ft. in diameter, 42 ft. high and are water sealed at the base. They consist of a cylindrical steel shell with circumferential angles at intervals which support a series of wooden baffles the function of which is to break up into small streams and thoroughly mix, the gas which is rising from the bottom and the water which is falling from the top. The water is supplied to each tower through 30 stationary spray nozzles so arranged as to deliver a fairly uniform rain over the entire area of the top baffle. These two towers were designed to work in parallel, but it has been found possible to operate with only one in service.

The gas enters the base of the tower at a temperature of about 365 deg. F., and with a dust content of 33.5 milligrammes per cu. ft. (0.517 gr. per cu. ft.), and leaves the top at a temperature of 75 deg. F., with a dust content of 4 milligrammes per cu. ft. (0.062 gr. per cu. ft.). The downcomers from the tops of the towers connect at ground level with a water sealed U tube which conducts the gas to a third Zschocke tower or, through a by-pass direct to the Theisen rotary washer. The plant is operating at present through this by-pass with the third spray tower not in use.

The rotary washer is of the usual Theisen construction, the rotating part being about 8 ft. mean diameter and 10 ft. long. It is driven by a 150 hp. Crocker-Wheeler motor at 300 r.p.m. By measurement when washing gas for two engines, the power required was found to be 300 amperes at 220 volts.

#### Efficacy of the Gas Cleaning Operation

The gas leaving the Theisen washer is practically free from dust, a 100 cu. ft. sample containing 0.15 milligrammes (0.0023 gr. per cu. ft.).

From the Theisen washer the gas passes through a water separator, 4 ft. 6 in., and 13 ft. 1 in. high, to a



50 ft. diameter gas holder, of 50,000 cu. ft. capacity. The gas holder is by-passed so that the engines can be operated with holder out of commission for painting or repairs. From the holder the gas enters the 42 in. diameter clean gas main which conveys the gas a distance of about 1100 ft. to the gas engines.

The water for the gas cleaning plant averages 105.7 gal. per 1000 cu. ft. of gas washed. This includes the water used in all parts of the cleaning plant.

#### Promise of Low Pressure Steam Turbine

Without being able to present figures at this time to support his position, the writer believes that under existing conditions in the Pittsburgh District as to prices for coal, turbines, gas engines and labor, a complete steam plant from gas fired boilers to low pressure turbines can be installed and operated to produce a given amount of power for less money than would be required through a gas engine plant. This would be due to lower first cost, lower attendance charges and lower repair charges on the steam plant. It is assumed that proper interest and depreciation charges are made to both plants.

H. J. K. Freyn, of the Illinois Steel Company, explained that at the Gary plant, which is entirely gas and gas engines, only 25 per cent. of the delays were charged against the gas engines. The gas engines in Gary were run on an average use factor of 33 per cent. That is about the same use factor of any of the large power plants in New York or Boston or Chicago, or elsewhere.

#### Europe and the Gas Engine

The gas engine, he continued, was started in Europe about 1899, and I had the pleasure of being connected with the birth of the gas engine, if you please. Five or six years ago, in an assembly like this, those people were also talking about cylinders cracking and piston rods breaking; and about all kinds of troubles, but if you go over there to-day you will not hear anything of the sort, for they have worked out the problems in the meantime. The gas engine in America is not to-day as far advanced as the gas engine in Europe, and cannot be, for the simple reason that only four or five years have elapsed since the first large gas engine was turned out, installed and operated.

Abroad gas engines are in operation of 48 in. diameter cylinders and 55-in. stroke, running at anywhere from 80 to 90 r.p.m. I have myself seen a twin tandem, double-acting, four-cycle gas engine, of 4000 kw., in operation on blast furnace gas.

The last installation of gas engines, those magnificent Snow engines at South Chicago or Duquesne, or the Allis-Chalmers and Westinghouse engines at Gary, are operating without any big repairs, and you will agree with me when I say that we are coming down in the cost of repairs and the cost of operation of these engines just as the Europeans have done.

#### The Cast Steel Engine Cylinder

The cast steel cylinder has not met with great success abroad, because people very rightly point out the fact that while the modulus of elasticity of cast steel is much higher than that of cast iron, about three times as high, or two and one-half times as high, the co-efficient of elongation by temperature is, on the other hand, very much higher again. The product of the two factors, which is called the co-efficient of quality, of cast steel as compared with cast iron, is about the same. In other words, you get from a cast steel cylinder greater elongation due to changes in temperature, than in the iron cylinder, which offsets the difference in the modulus of elasticity. I was surprised to see 48-in. cast-iron pistons in use abroad without cracking.

#### Dust in Making Ferrosilicon

Recently one of our furnaces has been making ferrosilicon. That means an awful amount of dust in the gas, and of a quality which is almost impossible to remove by a water process. The efficiency of our wet scrubbers dropped from 85 to about 50 per cent, while the efficiency of the Theisen or Zschocke washer is kept at approximately 98 or 99 per cent. Everybody having gas engine plants in operation in connection with steel companies in this country knows that there is no trouble at all with dirt in gas. Our engines are not being cleaned

even once a year. As a matter of fact we have not got time to clean the engines and we do not need to. The other day I pulled out a cylinder head on one of our old Chalmers gas-blowing engines and I called everybody in the plant that I could get to look at that cylinder. It was absolutely polished like a piece of glass, and the amount of dirt in the cylinder head and on the piston and in the counter-bore was not enough to make a handful, almost no carbon to be seen.

#### Tribute to an Oiling System

I was surprised to see that in one plant, the Carrie Furnace plant, the oil consumption was about one-half of what it ran in other plants, one-third in some instances. This was due, in my opinion, exclusively to the application of the Horton oiler. Mr. Horton, engineer of plant efficiency at Homestead, has designed an oiler which operates by compressed air and squirts the oil on to the piston and into the cylinder by means of compressed air. The saving of oil is perfectly remarkable. The cost of oil is an amazingly low figure.

#### Material for Gas Engine Piston Rods

A. E. Maccoun, superintendent of the Edgar Thomson furnaces of the Carnegie Steel Company, said that the material the piston rods were first made of was nickel steel as this was thought to be the best material to use, but it was found very unreliable for this particular class of work and numerous failures developed. Open-hearth steel, of the following composition, was found more satisfactory: Carbon, 0.45 to 0.60 per cent.; manganese, 0.45 to 0.60; phosphorus, under 0.04; sulphur, under 0.04; silicon, 0.10 to 0.20; to be heat treated to get 50,000 lb. per square inch elastic limit, 95,000 lb. per square inch ultimate strength and 12 per cent. elongation in 2 in. He added that no trouble has been experienced by the wearing of piston rods made from this material on account of softness.

At the Edgar Thomson Works he said they were compelled to line the inside of piston rods with brass tubing on account of the acid in the river water, and that they had to abandon all holes for the entry or outlet of water through the walls of piston rods, the water being now brought into and taken out of the ends of the piston rods, as the holes through the sides were found to be very convenient places for cracks to start.

A large rolling mill engine rated to develop about 1000 hp. is receiving the finishing touches at the plant of the Hooven, Owens & Rentschler Company, Hamilton, Ohio, for installation in the addition to the works of the Portsmouth Steel Company, Portsmouth, Ohio. The cylinder is 32 x 54 in. and is cast in one piece with the bed of the engine. The bed measures over 27 ft. in length and the total weight of the engine, without the flywheel, is about 225,000 lb. The flywheel, built in halves, is 22 ft. in diameter and weighs complete 80,000 lb. The engine is equipped with the maker's improved gravity valve gear.

Tom S. Wotkins & Co., Fulton and Front streets, Troy, N. Y., who conduct the largest retail coal business in the vicinity, have perfected a new removable horseshoe calk for heavy horses, and desire to arrange for its manufacture and sale. Several years of experimenting have been made under their own supervision, with their own teams, on all grades and kinds of pavement and in all sorts of weather through winter and summer, and the calk appears to have met every requirement. They state that a driver can easily replace a calk at any time, no tapping being necessary, as no threads are used.

The Busch-Sulzer Bros.-Diesel Engine Company, South Side Bank Building, St. Louis, Mo., reports quite a number of recent sales and installations of the American Diesel oil engine. The orders received represent buyers in various States, from Texas to Minnesota and from Florida to Massachusetts. The most important equipment mentioned consists of five 225-hp. engines for the General Phosphate Company, Pembroke, Florida. Some of the companies named in the list of buyers have sent in their orders for a third engine. An electric works orders an engine to be used as an auxiliary to water power. It is interesting to note that the United States naval torpedo station, Newport, R. I., recently installed a 225-hp. engine.

# Selling American Machine Tools in Europe

## The Use and Support of Continental Agencies

BY C. A. TUPPER, MILWAUKEE

In marketing American machinery abroad, is it best to sell directly to users or through agencies?

The answer to that question depends almost wholly upon the extent and character of the campaign which the manufacturer, after a careful survey of conditions, decides to undertake. If he has a product which can be sold in considerable quantity, so as to justify the establishment of branch offices, each with its own corps of resident and traveling salesmen, he will undoubtedly get the best results from that method; provided, of course, that he has gauged the requirements of the trade correctly and that his employees abroad are competent for their tasks. Ordinarily, however, neither of those conditions has been adequately met, and the result is that the manufacturer desirous of doing an export business has either abandoned the field in disgust or has fallen back upon representation through agencies.

### Agencies Most Economical at the Start

For the beginning, in most cases, practical experience points to agencies as the surest and at the same time the most economical means of introducing American metal-working machines or appliances in Europe. It therefore remains, first, to choose those agencies wisely and then to utilize their services intelligently. There is much of experience bound up in the first part of that sentence; a great deal more is comprised in the second.

It is not difficult to learn the names of good European agents. The Bureau of Manufactures, at Washington, has a list, selections from which will be furnished on application; American consuls are glad to give information on the subject; and American manufacturers now selling abroad will usually state to other companies, when asked to do so, what agencies they have found reliable. In making a choice it is, in any event, desirable to secure American references and to be governed largely by the advice contained in the latter.

Foreign representation, exclusive of branch houses, can be roughly divided into three classes. Large central agencies having branches in the principal countries of Europe and a well organized selling staff; smaller agencies covering a single section, industrial district or city, and firms or individuals intensively cultivating a limited field. There are also innumerable sub-agencies, to whose work no separate reference need be made in the present article.

### Central Agencies

The tendency of the larger manufacturers on this side of the Atlantic is to place their interests almost wholly in the hands of the central agencies, particularly where they have a varied line of specialties to offer. For them this method has its advantages. Wherever there is to be a large installation, such as the complete equipment of a new plant or the remodeling of a shop, these agencies almost invariably have the list to bid on, and they are able to keep a fairly steady stream of orders coming in, owing to the extent of the territory from which their custom is drawn.

For the principal countries of Europe, the offices of these agencies are located in the largest cities, which are also the political capitals. Most of the headquarters are in London, Berlin and Paris. In Russia selling effort is concentrated in St. Petersburg and Riga. For Italy one of the cities of the north, such as Milan or Turin, will be chosen; in Switzerland, Zurich and Geneva; in Austro-Hungary, Prague and Buda-Pesth rather more than Vienna; in Spain, Bilbao; and in the other countries a main or branch office is apt to be located in any one of a number of the larger centers of population. Frequently these agencies will have offices and salesrooms also in other cities of the countries above mentioned, where the extent of the trade justifies additional district managers.

### Smaller Agencies

Many of the most successful selling campaigns abroad have been carried on through the class of agencies second

above referred to, as, for example, one covering the large industrial district of which Düsseldorf, Germany, is the center. The activities of such agencies, not being so widely diffused, can be concentrated upon the particular requirements of a carefully cultivated trade, and the personal element in selling enters more largely into their methods. When manufacturing flourishes, as at present, the representation secured through such agencies is likely to be very effective. On the other hand, if business in the district happens to be generally dull, or orders for equipment have been pretty well filled for a time, their returns may be discouraging. To some extent this deficiency, however, may be and is commonly offset by correspondence or by sending traveling men into other territory.

### Individual Agents or Firms

The class of representation third above mentioned, through firms or individuals soliciting such trade as they can personally look after, has also been made to yield good results; and to the discriminating selection of agents of this character has been due the phenomenal success abroad of a number of American machine tool builders. It is best adapted to companies having only a moderate annual output, which they wish to distribute around through Europe in such a manner that the location of the tools in service will count heavily as a means of pushing sales when a greater volume of business can be handled. By that time there has been built up an organization closely identified with the American manufacturer's own interests, which he can utilize with increasing effectiveness as his facilities at home develop. For my own part, I would prefer this method to any other under the conditions cited.

The above division can, as I have stated, be only "roughly" made, for the reason that the elements of all three are intermingled in the work of some of the best agencies; and in entering upon or sustaining an extended sales campaign where a large volume of business can be offered for export, it is practically essential to have all three. To illustrate this by reverting to the subject of the large central agencies:

In Europe the metropolis of a country is ordinarily its political capital. Activity of every description radiates from it; buying and selling in all phases of commercial life are concentrated in it. The large central agency, prominently placed on a busy street, with showrooms where machines can be displayed and demonstrated, is, therefore, in a position to bring its wares before large numbers of visitors from the provinces, as well as from the industrial suburbs that usually surround a large city. Travelers from distant countries are also attracted to these agencies and not infrequently leave orders of considerable size. This is particularly true of London and has recently become a factor in the trade at Berlin.

Germany, like America and England, is getting to be the stamping ground for all foreigners bent on acquiring industrial knowledge, at first hand, from the latest developments in the various fields of manufacturing. The Japanese, of course, are now omnipresent. I seldom visited a large plant without running into at least one, or finding his name on the visitors' register immediately preceding my own; but investigators from other countries of Asia, from Australasia, South and Central America, South Africa and Mediterranean lands, as well as North America, are now common. These are, to a very considerable extent, the managers—perhaps the sons or other relatives—of wealthy proprietors of similar plants in their home countries; and not infrequently they have authority to buy new machines of the models that impress them the most favorably. Sooner or later nearly all such visitors "do" the large capitals of Europe, and they are very apt to complete their investigations by a round of the agencies where the types of machinery in which they may be interested are displayed. Here, if anywhere, orders are the most likely to be left.



### The London or Berlin Agency

And I will say this: If I were a metal-worker of Buenos Ayres or Durban, I would much rather order an American machine tool from the stock of a London or Berlin agency (which for the latter's export trade would be in store at the free harbor of Hamburg, thereby avoiding payment of any extra duty) than from the manufacturer in this country or his New York representatives. I could depend upon getting it at the date of delivery specified, with no parts missing and with no disagreeable complications regarding drafts or other forms of payment. Also, I would have the assurance, at Berlin, after a tour of German shops and German salesrooms, that I had seen the pick of American machine tools. Said an expert from this country (Captain Carden) in an article written for Harper's Weekly, some years ago: "If one would know which are the best American machine tools, go to Germany. The Germans know." This is literally true; and he might have said the same of the French, the Belgians, the Swiss or almost any European nationality except the English. Perhaps I do the latter an injustice; but, with the exception of such concerns as Alfred Herbert, Ltd., whose representative, William Hill, recently delivered a very interesting address in this country, I was not very favorably impressed with their ideas of shop equipment.

To return specifically to the subject of agencies: I think I have said enough to indicate the advisability of being represented in the large political and trading centers; but the benefits accruing from proper sales effort in manufacturing districts, such as those in which Chemnitz, Leipsic or Nuremberg are located, should not be overlooked.

### Agents Must Be Conversant with Apparatus

The proper selection of representatives is, however, but the initial step in any campaign from which results are to be expected. Having made his choice of agents, the American manufacturer should see, first of all, that they are thoroughly conversant with the advantages and full uses of the apparatus which he has to offer. Then he must give them proper backing and support.

To explain with any degree of fullness what is meant by both or either of these propositions will require a separate treatise. Let any American sales manager, however, put himself in the place of his European agent, which is not a difficult feat of the imagination. What information would he, himself, need as the basis of a successful selling campaign? What co-operation from his principal in this country would he require? It does not call for a knowledge of European conditions any more than domestic to reply to these questions in his own mind; for their answers are embodied in fundamental business principles. Common sense will teach any successful business man, who gives the subject adequate thought, what his representative in the foreign field, be it in France, Brazil or China, needs as the basis of conducting the business.

In correspondence with an agent the manufacturer should be very careful not to have any loose statements creep into his letters, nor to lead the agent in any way to make claims for the apparatus that will not stand the most rigorous service tests. The foreign customer who considers himself deceived in any particular seldom comes back. On this account, also, it is important, before making arrangements with any agency, to ascertain whether it is considered among users to be absolutely reliable in its statements and dealings. As a general thing, European salesmen who expect to sell regularly to a certain trade are very careful in the claims that they make; but men with loose, irresponsible tongues are found the world over, and they break into the machinery trade abroad as well as in this country. Naturally, agents of that character are continually looking for new connections, and some American manufacturers get hooked up with them, seriously to their detriment.

At this point it may be well to inquire whether exclusive representation should be required of an agent. If he is selling some specialty for which a large trade can be worked up, and the American manufacturer is willing to subsidize him until such time as the sales are sufficient in volume to yield a fair return for his efforts, I should say "Yes"; but it can hardly be looked for under any other conditions. With respect to the large central agencies it is less practicable, for obvious reasons. This, however, is a

phase of the agency question in which general statements are apt to be misleading; and each case needs to be considered strictly in the light of its particular conditions.

A further complication arises from the fact that most agencies handle both European and American tools, and that a number of the leading manufacturers abroad of metal-working machinery fill out their own lines with sales of American apparatus, thereby putting them in a position to offer complete shop equipments. In probably the majority of cases, either of these arrangements has worked out satisfactorily to all concerned; but both are liable to misunderstandings, and all of the circumstances likely to arise should be carefully gone into in advance of any agency contract.

### Printed Matter

No really efficient representative should be expected to get along without the assistance of proper printed matter. This should be expressed in terms comprehensible to European users and prepared with the aid and approval of the agencies concerned. For the Continent it ought to be provided in two languages, French and German. With these, 75 to 80 per cent. of all the metal working establishments of Europe outside of Great Britain (namely, in France, Belgium, Germany, Switzerland Austria proper and the Baltic provinces of Russia) can be reached directly in the tongues spoken by their personnel; and of the remainder, including other parts of Russia, Bohemia, Moravia, Hungary, Italy, Spain, Portugal, Holland, Finland and the Scandinavian countries, there are few indeed where the men in control of the work do not speak one or the other of the two leading languages of the Continent.

It is preferable to print the description of each machine separately on a single or two-page sheet of light tough paper—having, however, a smooth surface that will take a satisfactory imprint from half-tone plates. Good illustrations go a long way toward introducing American machines abroad, when the favorable impression created by them is followed by proper sales effort. While there is not the discrepancy in this respect that there once was between American and foreign work, our catalogue cuts and printing are considerably better than the run of European specimens, and this is an advantage of which American tool builders, or other manufacturers of metal-working machinery, should not fail to avail themselves.

### Demonstrating

No article on the subject of agencies would be complete without a reference to the value of demonstrating. It stands to reason that a machine properly demonstrated by one who is expert in its operation has a much better show of being purchased abroad than apparatus equally as efficient the good points of which are not clear. That so many American tools were sold for a good many years in the leading industrial centers of Europe, without adequate explanation of their merits, speaks more for the perception of foreign users than for the business instincts of our manufacturers. Recently, however, it has come to be the practice of the more enterprising firms of this country to send men to Europe precisely for that purpose. The most successful method of making their work count is to have them accompany the salesmen of the various agencies in their rounds of the trade, spending each week or fortnight with a different one and teaching the latter how to demonstrate the good points of the machines by doing this in the presence of the prospective customers. The details, including the very important one of getting a heavy machine in a position to be shown to possible users, have to be worked out in different ways, according to circumstances.

To give in conclusion, however, a couple of examples of what demonstrating will do in the way of introducing new machines, I cite the following incidents:

A large manufacturer of bridge and structural steel, whose works are in Rhenish Prussia, stated that a line of cutting, drilling and riveting machinery of American make which he had in operation had been bought on the basis of a series of successful demonstrations made under the supervision of an expert salesman from one of the agencies in Köln. Competitive apparatus had been offered at a lower price; but his choice had narrowed down to the latest American types; and, having only catalogues (in English) of the other machines offered from this country, he had preferred to depend upon the witness of his own eyes, thereby taking no chances. Similarly, with respect to

good-sized installations of machine tools and other shop or mill apparatus at various places, I found that their purchase had been practically decided by the same circumstance; that is, the presence of a demonstrator.

In accord with these facts is the account given me by an American salesman of the first sale of a line of screw machines made by his house in France. Learning, while in London, that there was an opportunity of furnishing the equipment for a new shop near Paris, he braved the terrors of the English Channel and sought the proprietors. They understood no English and he could not speak French; but, using one of their old machines in illustration, he showed by appropriate gestures the advantages of his new type, of which he had a photograph, and finally secured their order for a complete installation. Acceptance and payment were to be contingent upon the machines doing what he represented. In drawing up the contract he secured the services of a well-known Paris machine tool agency, the members of which were so impressed by his success that they hastened to close with him an arrangement very favorable to his house for the future sale of the machines in that territory.

It seems incredible that such a sale could have been made merely by the use of sign language and a few words of tourist French, like "oui, oui;" but it merely goes to show the influence of personal salesmanship and the enthusiasm resulting from a thorough knowledge of a product. When this can be instilled into a European agent—and it is quite possible to do so—the last touch has been added to preparations for a successful campaign, aside from the ordinary details of banking arrangements, collections, credits, etc., which business prudence dictates.

### A Book on Arc Lamp Operation

A book on the "Practical Operation of Arc Lamps" has been edited and published by the National Carbon Company, Cleveland, Ohio. It contains 76 pages of practical and helpful points regarding every phase of arc lamp construction and operation. Numerous illustrations marked in such a way that they closely hook up with the article make it easy for the lamp man to understand the points brought out in the text.

A number of practical tables are given and an index at the close of the book makes it possible to locate quickly any article in it. No advertisements are scattered through its pages, and the general editorial policy carried out is seemingly that of thorough and practical information which the company and its lamp engineers and salesmen have found lamp owners and operators want.

A copy of the book will be sent free on request to any one connected with the construction, operation or maintenance of arc lamps of any form.

The West Virginia Fire Clay Mfg. Company, with main plant at New Cumberland, W. Va., and others in Ohio and Pennsylvania, has recently improved the first-named property by a brick addition, 75 x 120 ft., which has been equipped with two 300 hp. Coatesville boilers, a 300 hp. Hamilton-Corliss engine, two new Stevenson dry grinding pans, etc. The company manufactures fire brick and shapes and fire clays and has a growing trade with iron, steel and general manufacturing companies. It also furnishes fire clays to the United States Government for use in furnace work along the Panama Canal. The clay is carefully shipped in specially constructed barrels to Norfolk, being thence conveyed by government ships to Panama. N. W. Ballantyne, secretary and treasurer, handles the company's sales from offices in the Diamond Bank Building, Pittsburgh, while Elmer E. Melick, Philadelphia, handles the Eastern sales.

The blast furnace of the Clinton Iron & Steel Company at Pittsburgh, which was blown out recently, will be relined and considerable new equipment will be added. This is the oldest stack in the Pittsburgh district, having originally been built in 1859, but it has been remodeled and enlarged a number of times. It has a daily capacity of about 200 tons, but this will probably be increased to 250 tons, when the proposed improvements and additions to the furnace have been completed.

### The Sheet and Tin Plate Scale

Below is given a copy of the scale agreement reached at Pittsburgh recently between the independent sheet and tin plate manufacturers and the Amalgamated Association for the scale year beginning July 1:

We, the undersigned sheet and tin plate manufacturers and the Amalgamated Association of Iron, Steel and Tin Workers, agree that the scale of 1910-1911 shall be the scale for 1911-1912, subject to the following amendments and additions:

#### Sheet Mill

1. That the schedule of minimum and maximum weights be changed to read as follows:			
Gauge.	Maximum.	Base.	Minimum.
7.....	7.81	7.5	7.19
8.....	7.18	6.875	6.56
9.....	6.55	6.25	5.94
10.....	5.93	5.625	5.31
11.....	5.30	5.	4.69
12.....	4.68	4.375	4.06
13.....	4.05	3.75	3.44
14.....	3.43	3.125	2.97
15.....	2.96	2.8125	2.66
16.....	2.65	2.5	2.38
17.....	2.37	2.25	2.13
18.....	2.12	2.	1.88
19.....	1.875	1.75	1.63
20.....	1.625	1.5	1.44
21.....	1.4375	1.375	1.313
22.....	1.3125	1.25	1.188
23.....	1.1875	1.125	1.063
24.....	1.0625	1.	0.94
25.....	0.9375	0.875	0.8126
26.....	0.8125	0.75	0.719
27.....	0.71875	0.6875	0.6563
28.....	0.65625	0.625	0.594
29.....	0.59375	0.5625	0.5313
30.....	0.53125	0.5	0.469
31.....	0.46875	0.4375	0.4219
32.....	0.42188	0.40625	0.3906

Clause 20 as changed in convention, mutually agreed, and now reads:

Payment of all regular employees called for in the scale shall be made by the company, and rollers shall be furnished with pay statements of all tonnage men prior to pay day. Such statements to be accessible to each member of the crew interested.

Clause 24 changed to read:

Company to furnish extra help not to exceed two men on sheets 36 in. wide or over, containing 22 sq. ft. or more, and on all bars of any width weighing 55 lb. or over.

New footnote 33. All bars scaled in the pair furnace shall be swept by the pair heater.

#### Tin Mill

Clause 5 was agreed to with the addition of the following paragraph:

But it is understood that if the sheets or tin plate are cut to smaller sizes and tinned at plant where made, the tin mill scale shall be paid.

Footnote 6 was changed to read:

Where improved squaring shears are used, the company shall pay for opening packs and grinding the knives, and in mills where plates are cut to smaller sizes than 14x20 in., additional pay shall be arranged, etc.

Footnote 8 was changed to read:

It is agreed that no more than four changes in the classification of sheet and tin plate mills can be made during the scale year, and due notice shall be given before such changes. Each member of the crew to maintain a position on each change or classification.

Clause 23 of scale of 1910-1911 to be eliminated.

The following clause was agreed to:

All bars shall be swept by doubler or doubler's helper, when in the judgment of the roller such action is necessary to insure perfect plates.

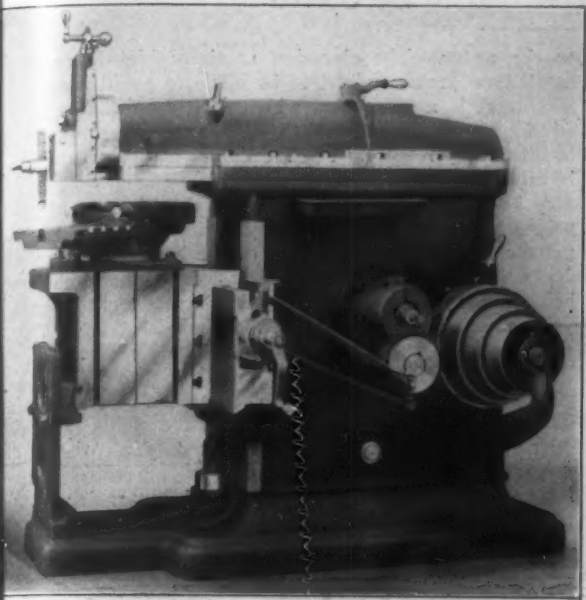
The signers of the sheet and tin plate scales of the Amalgamated Association agreed upon as above are as follows: American Rolling Mill Company, Middletown, Ohio; Atlanta Tin Plate & Sheet Mill Company, Atlanta, Ind.; Carnahan Tin Plate & Sheet Company, Canton, Ohio; De Forest Sheet & Tin Plate Company, Niles, Ohio; Empire Iron & Steel Company, Niles, Ohio; Follansbee Bros. Company, Follansbee, W. Va.; W. H. Griffiths, Washington, Pa.; National Enameling & Stamping Company, Granite City, Ill., and St. Louis, Mo.; Newport Rolling Mill Company, Newport, Ky.; Pope Tin Plate Company, Steubenville, Ohio; Thomas Steel Company, Niles, Ohio; N. & G. Taylor Company, Cumberland, Md.; Whitaker-Glessner Company, Wheeling, W. Va., and Martins Ferry, Ohio; Youngstown Iron & Steel Roofing Company, Youngstown, Ohio; Zug Iron & Steel Company, Pittsburgh, Pa.

The Allegheny County Light Company, Pittsburgh, has placed an order with the Westinghouse Electric & Mfg. Company for ten 250-kva. and two 200-kva. transformers of the oil-insulated, self-cooling type. Other recent orders for transformers and other electric station equipment received by the Westinghouse Company include the following: New York Edison Company, 1000-kva. oil-insulated, self-cooling transformer, tubular type; Great Western Power Company, San Francisco, Cal., six 300-kva. oil-insulated, self-cooling transformers.



The New Queen City Crank Shaper

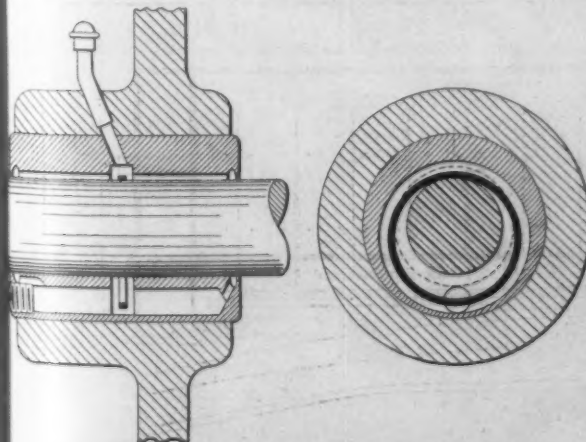
The 16-in. back-geared crank shaper, shown in the illustration, is an improved type brought out by the Queen City Machine Tool Company, Cincinnati, Ohio, containing



The New Queen City Crank Shaper.

a number of improvements, which also are about to be incorporated in the three larger sizes of the machine. Very particular attention has been paid to the lubrication and the bearings. Those that have to do with delivering the driving power to the ram have heat treated and ground journals running in cast iron. These comprise the crank pin, bull wheel, the driving and the driven shafts, and the lower rocker arm shaft, and also those that connect the link with the rocker arm and ram. The crank pin, which has the heaviest duty to perform in proportion to its size, is a crucible steel casting over which is pressed a heat-treated sleeve, ground to be a running fit in the cast-iron crank block. This block has an oil reservoir with channels cut to insure thorough distribution of the lubricant, which is lifted from the reservoir on to the crank pin by a chain, the oil always falling back to the reservoir. Consequently a continuous flow is assured. Means are provided for drawing off the oil and replacing it with a fresh supply. The bull wheel hub is similarly provided with a hardened sleeve and the same oiling device is applied.

The cone pulley shaft has a 3-point bearing, which eliminates the overhang at the drive. The five journals of the driving and driven shaft are heat-treated and ground and run in removable cast-iron bushings. They are constantly flooded with oil by means of ring oilers. The chain is used where a ring will not lift sufficient oil when the shaper is running at slow speeds. Care has been taken in providing lubrication for the rocker arm and link shaft where neither ring nor chain can be used, the motion not being fully rotary.



The Oiling Device of the Queen City Crank Shaper.

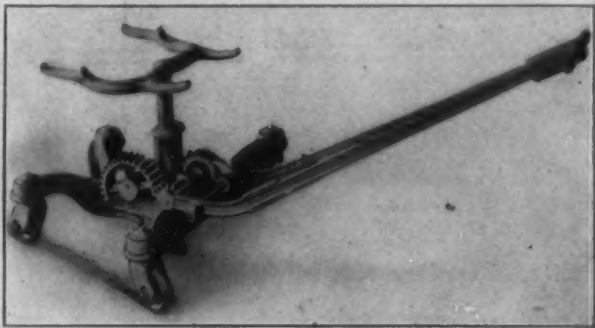
The belt pull of this machine is below the average, yet it will take very heavy cuts. The countershaft should run at 270 r.p.m. The four cone steps take a 2-in. double belt. The single gear ratio is 4 to 1; the back gear ratio 19 to 1. This combination gives the following cutting strokes per minute to the ram: 7.98, 11.78, 17.15, 25.31, 37.9, 55.95, 81.45, 120.24—a geometric progression. Twelve changes of feed are instantaneously obtainable without danger to the operators' fingers. Combined with the eight speeds, the range of the machine is complete.

As to accuracy, the machine is designed to produce work to within .0005 in. for the full 16-in. stroke. The arch ram is an important factor in securing the required rigidity of the cutting tool to accomplish this result, and the general design of the machine combines to enable work to be held solidly while being machined. The shaper is low, which lends convenience to its operation, and the ram is proportionately unusually long. All flat bearing surfaces are of large area and are gibbed for taking up wear. The feed screws have micrometer adjustments, and the swivels are graduated.

A New Geared Ratchet Lifting Jack

A new geared ratchet automobile jack designed for use in repair work on automobiles, shown herewith, is manufactured by the Canton Foundry & Machine Company, Canton, Ohio. The working mechanism is simple, and the jack is quick in action and easy to operate. A pinion meshes the large gear wheel, the motion being imparted from the gear wheel shaft to a pinion engaging a rack on a tube which slides up and down in the frame. The tube is threaded on the inside, and into it screws the stem of the arms or antlers, so named from their peculiar shape. On the end of the pinion shaft is a double ratchet wheel.

The jack is controlled by two rods that extend from the handle bar down the inside of the lever to the working mechanism. One rod, operated by the left hand, controls both the lifting and lowering pawl, which are con-



The Canton Foundry & Machine Company's Ratchet Automobile Jack.

nected. The retaining pawl, working into the same ratchet wheel, is controlled by the rod operated by the right hand. The raising capacity is 5-in., and the screw stem furnishes an additional range of 7-in. The form of the antlers was adopted after much time spent in designing as one which would fit the rear axle of any make of automobile. The short horns are for lifting front axles, but the others may also be used for that purpose. The jack is regularly mounted on four rubber tired casters, with both ball and roller bearings, making it practically noiseless and easy to move around the floor of a garage, and is also built with three casters. When not in use the handle can be raised to a perpendicular position, so that a small space is occupied.

The E. W. Bliss Company has declared its regular 2 per cent. quarterly dividend on the preferred stock, payable July 1, but has passed the quarterly dividend on the common stock, which for a number of years has paid at the rate of 10 per cent. annually. In a circular to stockholders the explanation is made that since the International Brotherhood of Machinists called out the men only about one-third of the vacancies have been filled. The directors have indorsed the action of the officers in refusing the strikers' demands and have ordered the continuance of an open shop.

# The Windsor Machine Company's New Shops

The Model Plant in Which Gridley Automatics Are Built—Many Original and Interesting Features—Problems Which Had to Be Solved

The new plant of the Windsor Machine Company, Windsor, Vt., affords a striking example of the advances which have been made in machine shop construction and arrangement in the last decade. The design embodies a great many features which, although not all of them are essentially new, have been brought together in an original adaptation to the particular purposes for which these shops will be used. The mill engineers and the general manager of the company, George O. Gridley, have worked together to accomplish this desired end, the latter having given much study to the details as they might affect production and the peculiarities of the business. The company manufactures Gridley automatics, precision machines requiring the best of workmanship. The shops are planned with the purpose of building the machinery under the very best of manufacturing conditions as to the excellence of workmanship and rapidity of production. The result is one of the finest manufacturing plants in the country.

## The Location and the Layout

The works are most advantageously located. The building lies close to the main line of the Boston & Maine Railroad, and between it and the Connecticut River. The land is flat to the edge of the sharp decline which descends

to the water. The elevation is above high-water mark, so that no provision had to be made to avoid inundation. The tract is a large one, which will permit of extension of the works from time to time as the growth of the business may require. The location is one of great natural beauty, and the atmosphere is unpolluted. Incidentally it may be mentioned that Windsor, although a small town, possesses advantages in the way of labor supply, the Vermont country furnishing some of the best of raw material for workmen, and a large percentage of the skilled men being home owners and therefore located permanently.

A view of the exterior of the plant is given in Fig. 1, showing its peculiar construction. The office end of the building is in the foreground, together with the shipping platform on the spur track. Well to the rear is the unloading platform, with three cars on the siding delivering their contents. In the background, at the far corner of the company's land, can be seen the pumping station, where a general service and a fire pump, both motor driven, take water from the river. Fig. 2 is the general plan of the property. Fig. 3 gives the details of construction, including the saw-tooth roof and the windows, and suggests their relation to the ventilating system in conjunction with the swinging cowls. In Fig. 4 are interesting details of the sash construction with its double glass.

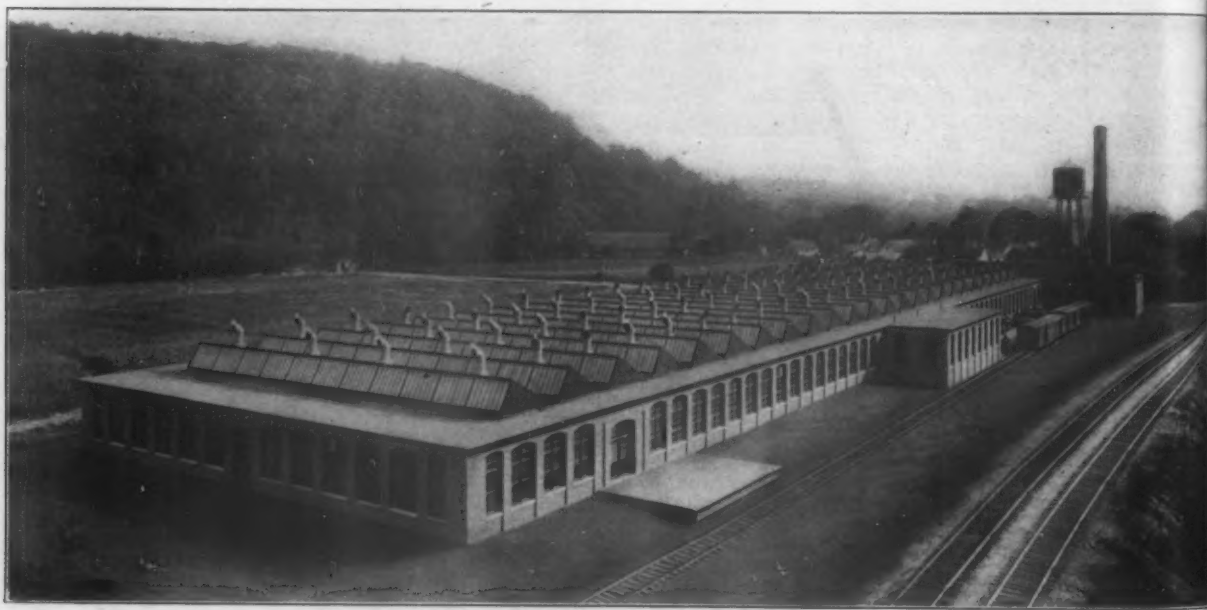


Fig. 1.—The Windsor Machine Company's New Works.

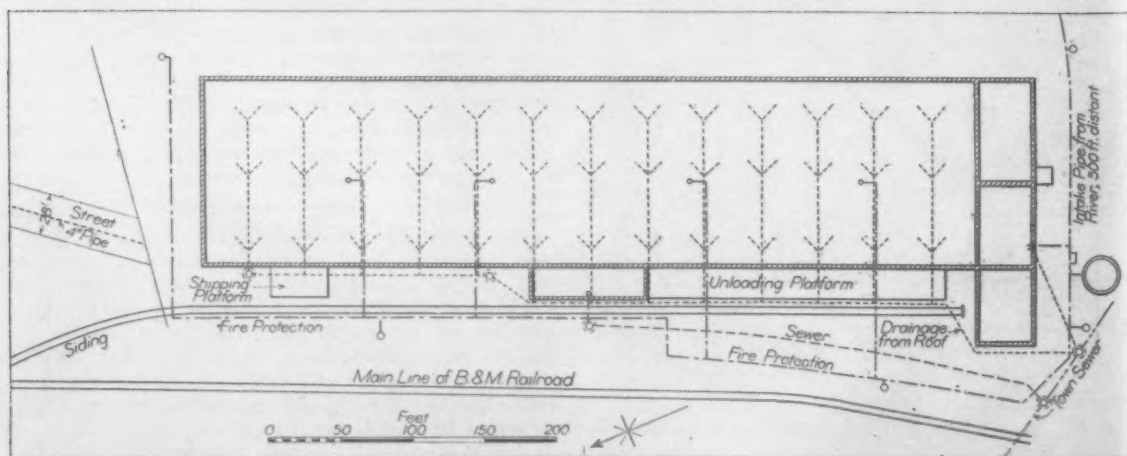


Fig. 2.—A General Plan of the Works.



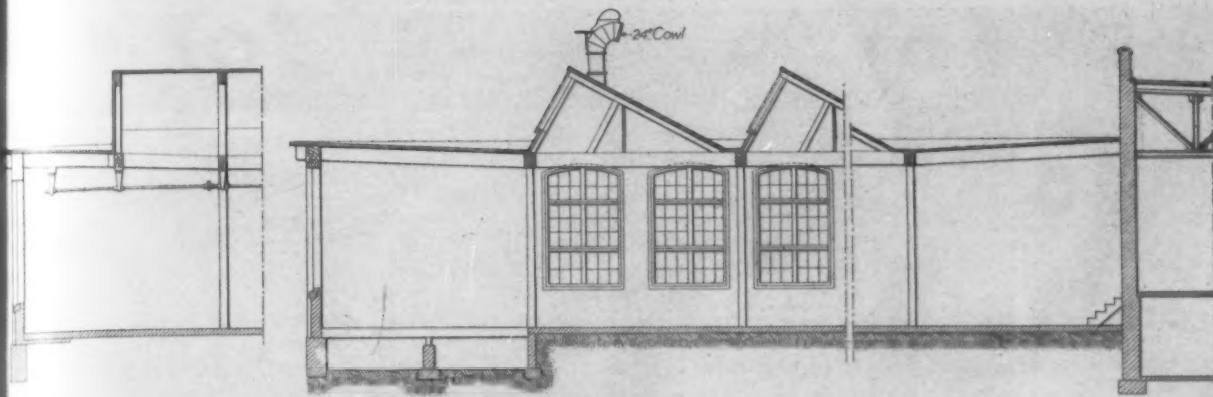


Fig. 3.—Construction Details, Including the Saw Tooth and the Side Windows.

The plant is under a single roof. The brick building is 130 x 584 ft. inside, with a wing at the rear 40 x 51 ft., containing the boiler room and an ell on the side in which the locker and toilet room is located. The machine shop proper occupies the entire building with the exception of

#### The Details of the Saw-Tooth Roof

The sashes of the saw-tooth construction are not arranged to open, the purpose being to prevent any possibility of leaking during heavy north rains or at times of melting snow. The company decided that ventilation would be amply provided by a series of swinging cowls, of which there are four to each tooth. To secure an absolutely water-tight sash, it is made double, with ribbed glass on the outside and plain glass within, there being an air space between the two which serves two purposes—the saving of heat and the prevention of troublesome condensation in cold weather and the resultant dripping.

This construction is shown in detail in Fig. 4. The angle of the saw-tooth is 30 degrees with the vertical. Each sash is 10 ft. wide and 6 ft. high. The outside panes are of ribbed glass, about 5½ ft. long, 16 in. wide and 5/16 in. thick, the smooth side being toward the weather. The glass is heavily puttied at the top and sides, but not at the bottom, where the pane rests on the sash, and is held by two small iron brackets, a construction which offers practically no surface to hold the snow, ice or dirt. The inside glass is plain, in two pieces, the joint resting on a center rail running horizontally. The glass is held in place by narrow strips which separate the inside and outside panes, leaving a space of about ¾ in. Between the two glass surfaces at the bottom of the sash are vent holes to carry away condensed moisture, which, together with any drip from the glass on the inside of the building, is caught in a small copper trough, which empties into the conductor pipes that drain the roof. The result is a weather-tight construction. The cowls by their suction pull the air from the top of the shop, operating to procure ample ventilation in conjunction with the swinging sashes of the wall windows, and also the heating systems, for a coil of hot water pipes crosses the shop just beneath the valley of each saw-tooth, and coils encircle the great room beneath the windows, a combination which assists the air circulation in a very important way.

The roof covering was given very careful study by the engineers in charge of the design. With the exception of the backs of the skylights and the valleys between them, the roof is covered with one layer of sheathing

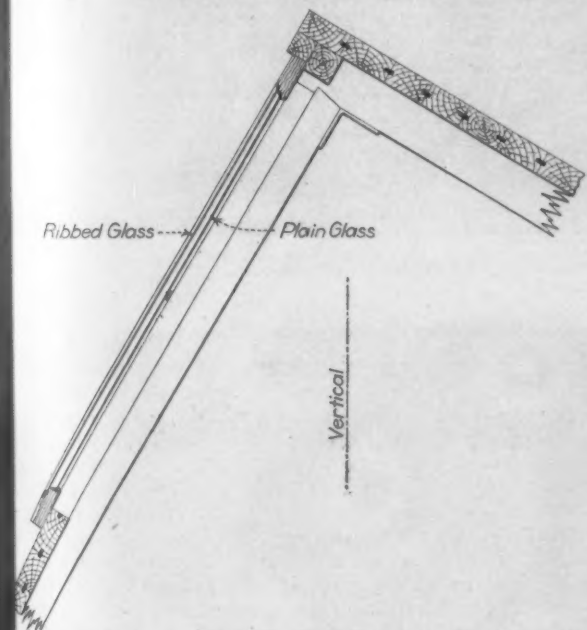


Fig. 4.—Details of the Saw Tooth Sash Construction.

the space at the front, in which are located the offices and the pattern shop, and that at the rear, where are the engine room and forge shop. The area of the machine shop is 130 x 480 ft. inside. The forge shop is 40 x 70 ft. and the engine room 40 x 60 ft. The building is one story throughout and is high studded, being 17 ft. from floor to the bottom of the valleys between the saw teeth, and 23 ft. to the apex.

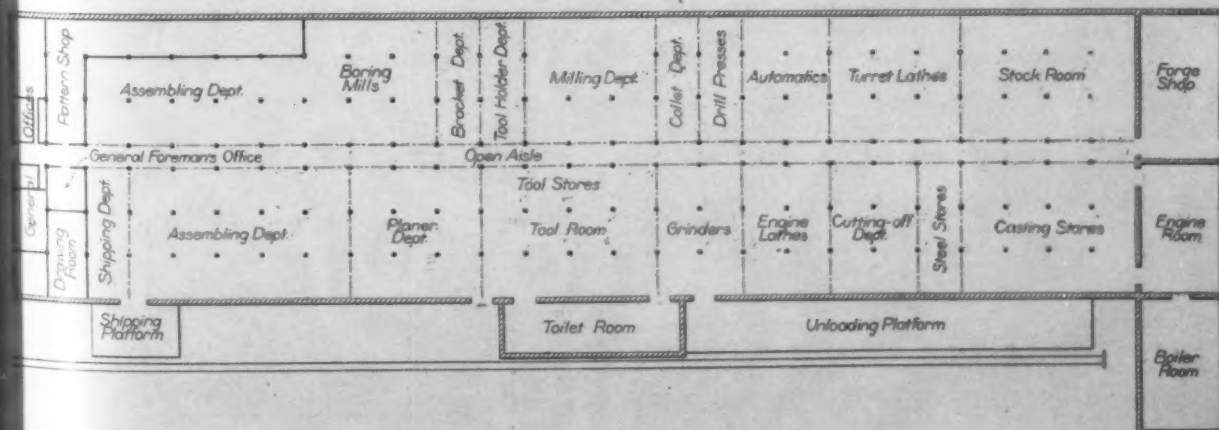


Fig. 5.—The Arrangement of the Machine Shop by Departments.

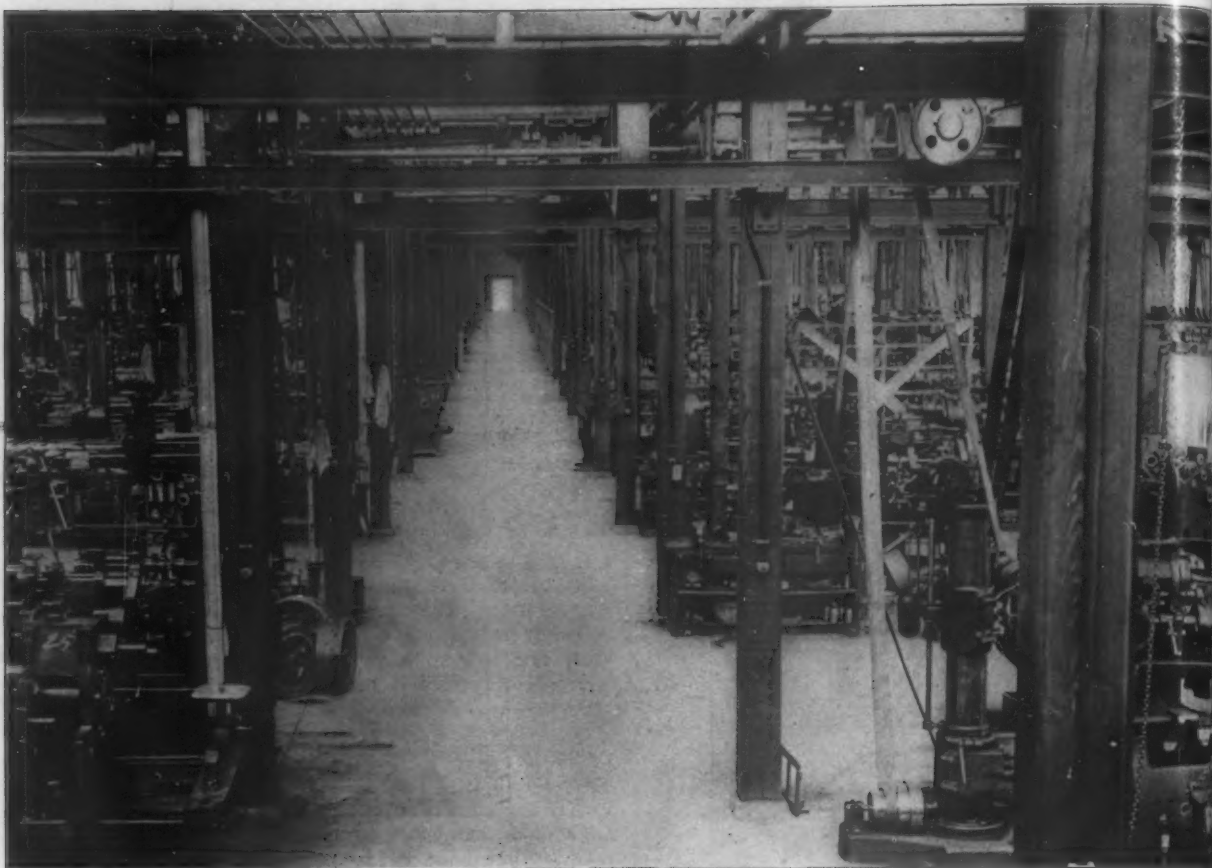


Fig. 6—The Interior of the Shop from the Office End, Showing the Long Open Aisle.

paper and with the best quality 5-ply coal tar felt, pitch and slag. The felt has an average weight of  $2\frac{1}{4}$  oz. per sq. ft. A layer of medium weight rosin-sized sheathing paper was nailed to the planks with the joints well broken; next three layers of roofing felt were laid so that each sheet lapped the preceding one, and each exposed edge was



Fig. 7.—A Group of Gridley Automatics in Operation.

nailed, using tin washers. The three plies were then thoroughly mopped, covering the whole surface with coal-tar pitch. A fourth layer of felt was applied, lapping the edges 2 in., and was nailed every 3 in. along the lap, and the entire surface was again mopped with pitch. The fifth layer was laid in the same manner but without nailing, pains being taken that the laps did not come over those of the preceding layer. The whole surface was then covered with the composition and the slag was spread into it while hot.

The backs of the saw-tooth roofs first received a layer of the rosin-sized paper, and then three layers of asphalt felt. This surface being mopped with hot asphalt, the fourth layer of felt was rolled into it. After nailing the application of hot asphalt was followed by a fifth layer, lapping the fourth. The valleys were given an extra layer of felt, making them six-ply thick. The entire surface received a final covering of hot asphalt, with slag spread into it.

#### The Machine Shop Arrangement

The machine shop has much of interest in its design and arrangement, as will be seen in the several illustrations. Fig. 6 is a view looking down the central aisle, which extends the entire length of the building from the main entrance of the general offices to the rear through the forge shop. The aisle is a feature in itself, in that an inviolable rule compels that its 10 ft. of width be kept open at all times for the passage of persons or trucks. The only obstructions are the doors at the office and forge shop ends. The center aisle requires only one-half the floor space of combined aisles at each outside wall, and is also more convenient in going from one part of the shop to another.

Fig. 7 is a group of Gridley automatics in operation. Figs. 8, 9, 10 and 11 show various departments, with an intimate glimpse into the machine arrangement. Fig. 12 is the erecting floor. Great pains were taken to secure an arrangement of the manufacturing departments, so that routing would be on a most economical basis. A study of the floor plan, Fig. 5, affords an excellent example of how well the company has succeeded in this attempt. Everything enters the shop at one end from the long unloading platform and leaves it at the other.

From the casting and steel stores and stock room rough material is delivered to the cutting-off department, to the engine lathes just beyond and to the turret machines and automatics across the aisle. Next are the grinders, drilling machines and the collet department; then the milling and tool holder and bracket departments. The planing and boring mills occupy opposite horizontal sections of the floor, an excellent arrangement, for the same hand-crane serves both, so that heavy work is quickly and easily transferred from one to the other. Finally the assembling department, occupying a large area, is reached. The tool room has a central position in the shop.

The toilet room has been isolated from the main building. It contains a steel locker for each man, and modern sanitary fixtures. The type of iron wash bowl deserves attention. On each side of the bowl are cast two studs which slide in a segment shaped slot in the frame of the stand. This permits the bowl to be tilted for the purpose of emptying its contents without the possibility of its leaving the stand.



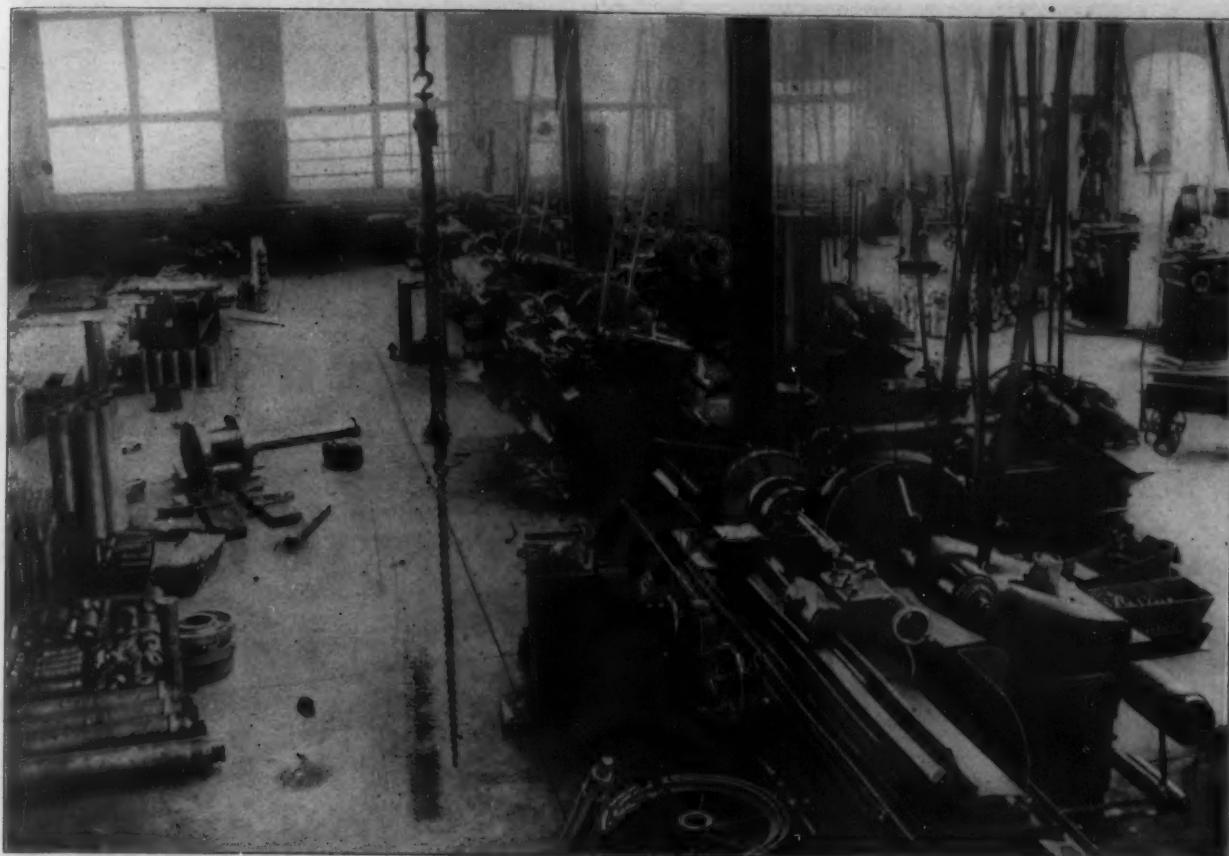


Fig. 8.—The Grinding Machine Department.

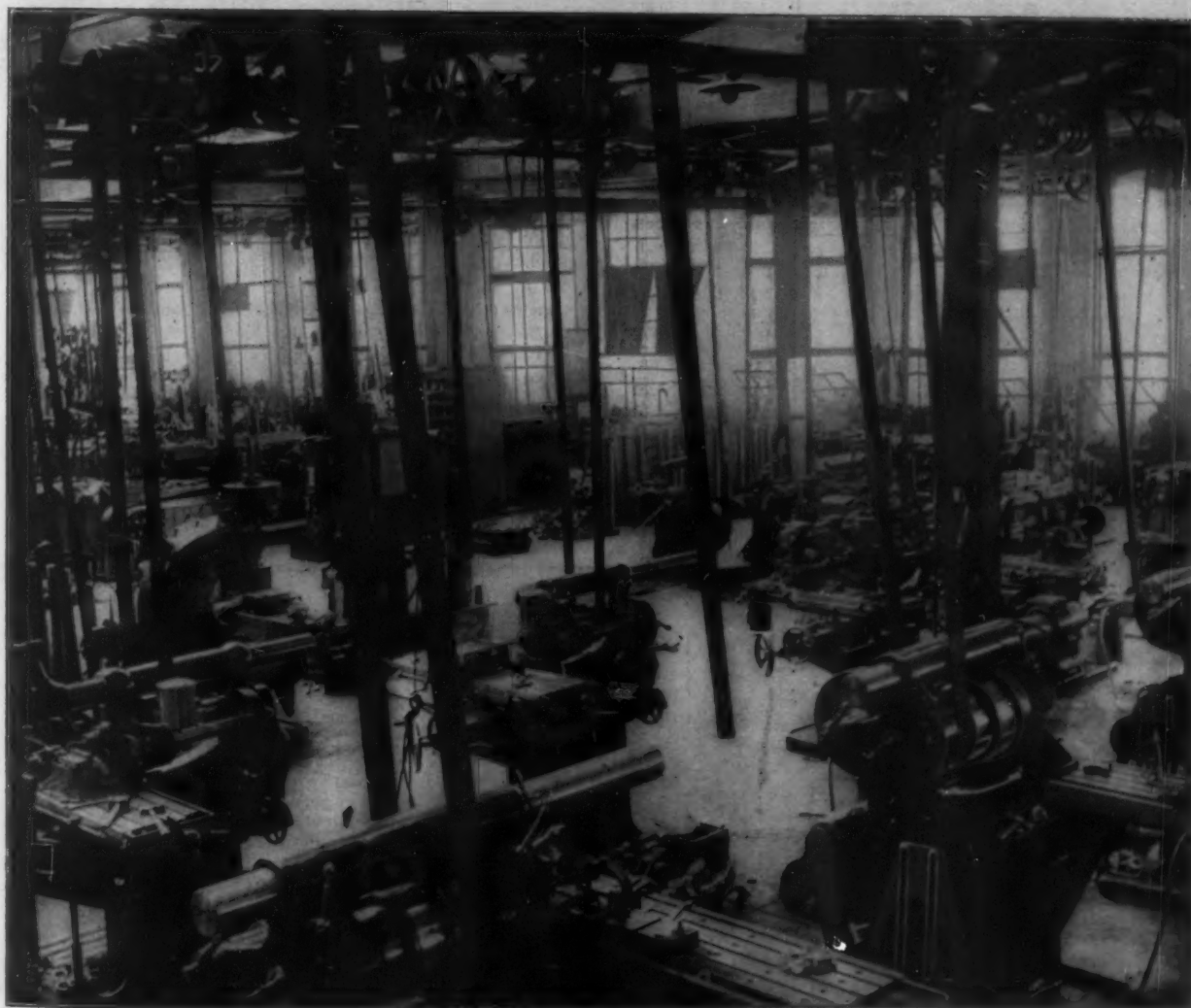


Fig. 9.—The Milling Machine Department.

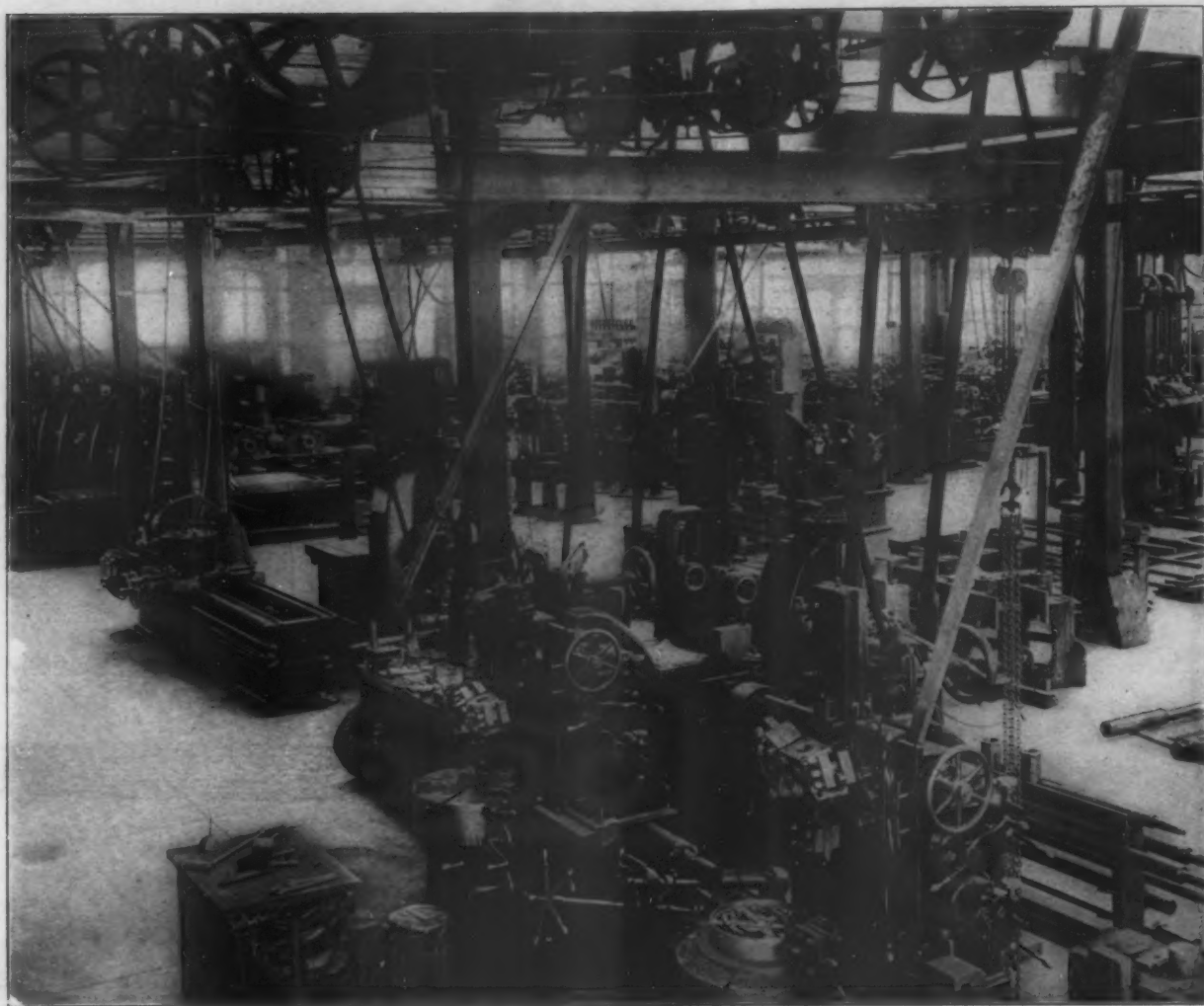


Fig. 10.—The Boring Department with a Glance of the Planers.

#### The High Speed Line Shafting

Returning to the shop, the line shafts extend across the building, each having its individual motor control. An unusually high speed, averaging 400 r.p.m., has been adopted for the shafting, and as a consequence pulleys on the line shafts are about the same diameter as those on the countershaft, a condition which is, of course, desirable. There are no wall benches. Instead individual benches are distributed at convenient points in the several departments. The floor of the shop is of solid concrete, 8 in. thick. Most of the ground was ready to receive the material without special preparation, being hard-pan. The remainder was filled in with suitable earth which was well tamped and puddled.

The forge shop, Fig. 14, is separated from the machine shop. Great care has been taken to give it complete ventilation. A high stack provides draft for the forges, and the fumes are carried away through hoods of ample proportions. The large concrete dipping tank is arranged for the easy handling of the work. The three furnaces are of the Brown & Sharpe type.

The drafting room and shop foreman's office are directly back of the main office. No door admits from the drafting room into the shop; entrance must be through the general foreman's office. In the view of the drafting room, Fig. 12, it will be noted that instead of the customary vault for the storage of drawings, the company has installed a modern fire-proof safe, especially fitted with drawers of the proper width to hold drawings of the different standard sizes.

A portion of the pattern shop is shown in Fig. 15. This gives an excellent idea of the arrangement of the window sashes for purposes of ventilation. The location of this department is in a sense temporary, for ultimately it will probably occupy space in another building.

#### The Power Plant

The power plant is worthy of careful study, for it contains much that is of interest to those who have in contem-

plation the installation of new power equipment for their own works. While the shops have not been operating many months, it is already certain that the power is manufactured and distributed very economically. Less coal is required for this large plant, which will employ more than 500 hands, than was consumed in the old shops of the Windsor Machine Company, when not half the power was generated. The lay-out of the equipment is shown in Figs. 16 and 17. Steam is supplied from a battery of three vertical Manning type boilers, located in a spacious building, Fig. 18, next the engine room. The piping, including the main supply for the engine, is shown in elaborate detail.

The power is from a Westinghouse-Parsons steam turbine, direct connected, with a 625 kva. generator, the current being 550 volts A.C. 3 phase 60 cycle. Fig. 19 shows the arrangement of the engine room. In the foreground at the left is the motor generator set, which supplies the direct current for variable speed motors. At the right is the De Laval steam turbine pump set, which forces the water through the heating system, and between them are the exciters, one being a turbo-driven, the other a motor generator set.

The switchboard arrangement is a feature of interest. Of the four wattmeters, one registers the total amount of current generated by the turbine unit; another the power consumed by the alternating current motors; a third the power consumed in lighting; and a fourth the power taken from the direct current generator. In this way the apportionment of power for its different purposes is recorded. The board is also connected with the town power plant. This current, when it is used, is distributed in the same manner as that from the generator, and may be switched over for use in lighting only.

#### The Problem of Water Supply

The pumping outfit is a very complete one. In fact, the problem of water has been one of the most difficult to solve. The water used for drinking in the bubbler drink-



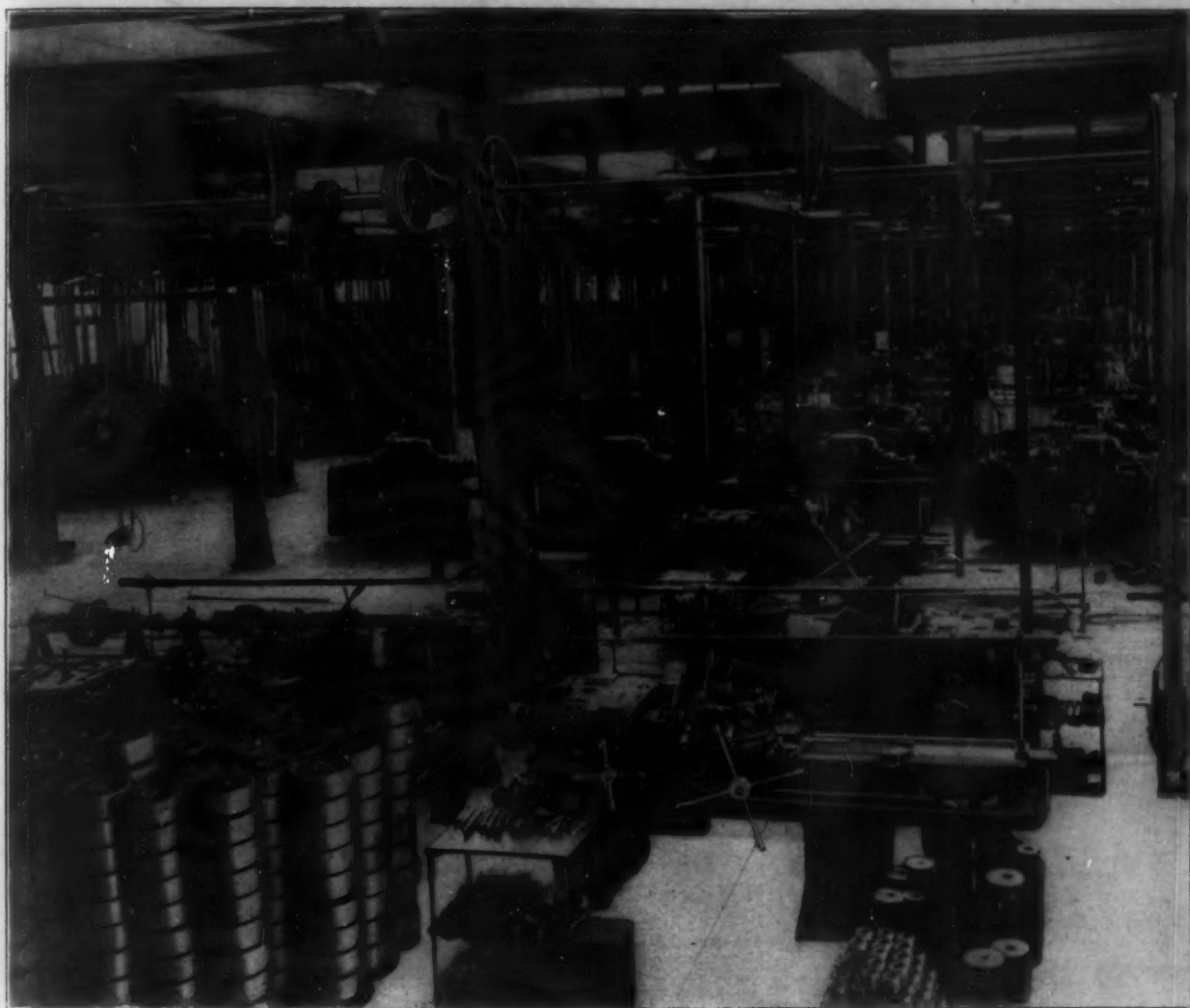


Fig. 11.—Some of the Automatics and the Turret Lathes.

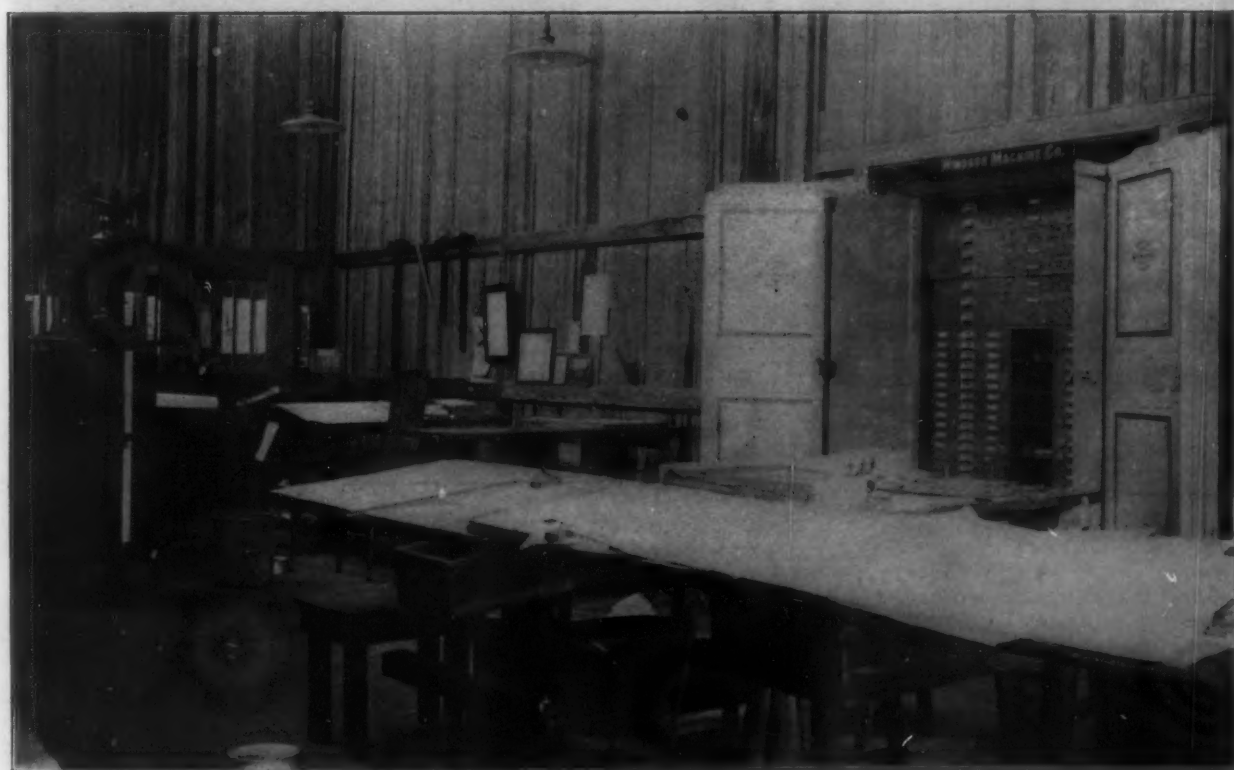


Fig. 12.—The Drafting Room, Showing the Fireproof Safe.

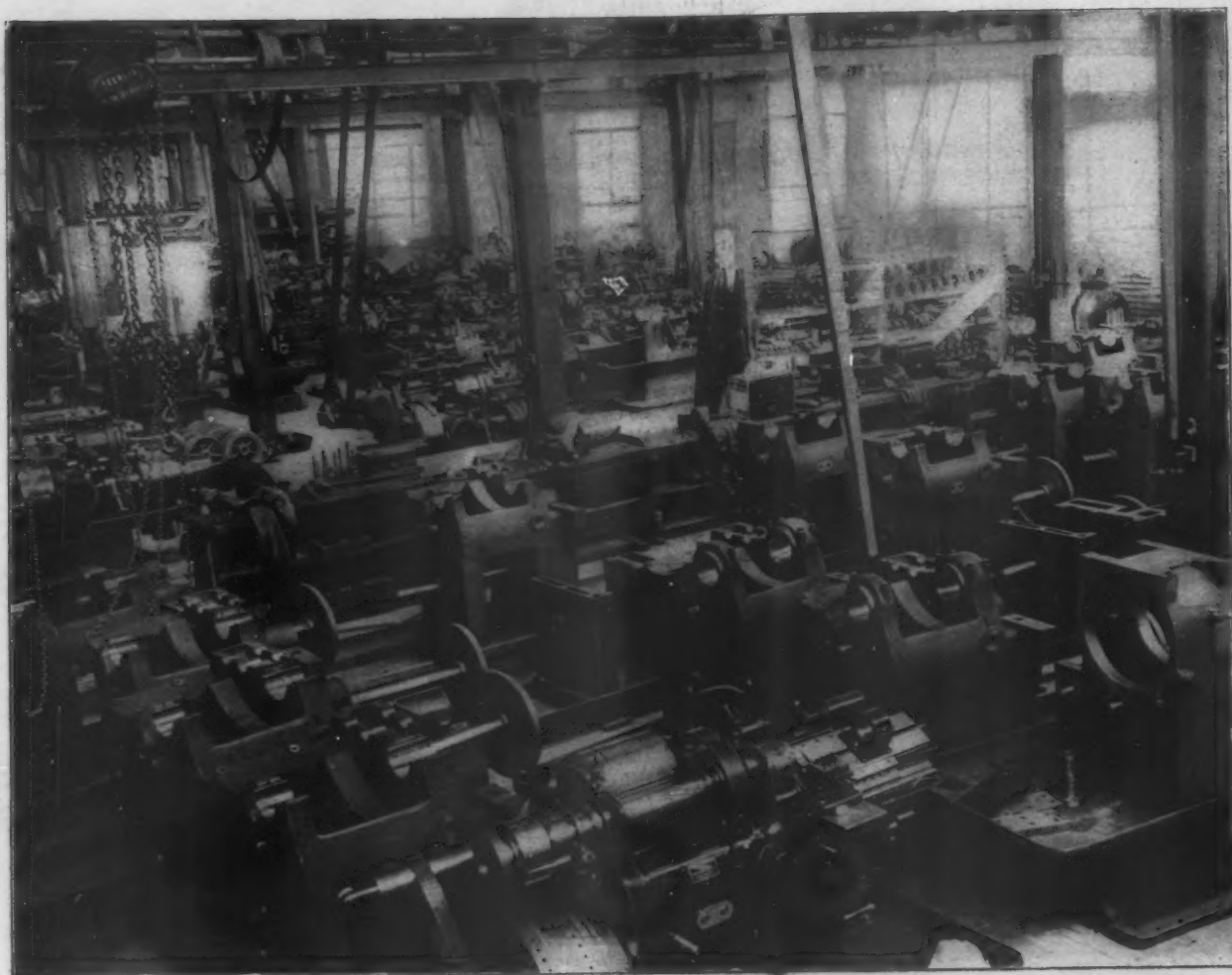


Fig. 13.—A Section of the Erecting Shop.



Fig. 14.—The Forge Shop.





Fig. 15.—A View in the Pattern Shop—Details of the Swinging Window Sashes.

ing fountains in the works and for similar purposes is drawn from the town mains, but the principal supply, including the water for the condenser and for the sprinkler tank, which holds 60,000 gal. and is 103 ft. high, is from the Connecticut River.

A general plan of the pumphouse is shown in Fig. 20. The river is located some 700 ft. from the main power house, has its mean level about 28 ft. below that of the floor, and a wide variation exists between high and low water, the extremes being 22 ft. apart. In building the pumping station a departure was made from the original plan, and as a result the company was compelled to operate its turbine without condensing for about two weeks.

The original decision was to sink the foundations of the building to the level of low water, so that the water would flow into the motor-driven centrifugal type general service and fire pumps, but construction difficulties were encountered and it was decided that the level of the pumps should be practically 10 ft. above low water, and that the suction pipe should be run down to low-water level and well out into the stream. By screening the opening into the pipe it was believed that impurities and debris from the river would be excluded.

But the contrary proved to be the case, for the condition of the river during very high water and for a week or two afterward is ill adapted for the arrangement as first carried out. Great masses of saw dust and shavings came down from the mills far above Windsor, the pipe became clogged, and it soon became necessary to cut out the condenser. However, the situation presented no serious engineering difficulties. As will be seen in the drawing, the solution of the problem is a concrete well with walls extending from above high water to a point below low water, receiving its supply from the river through well-screened openings.

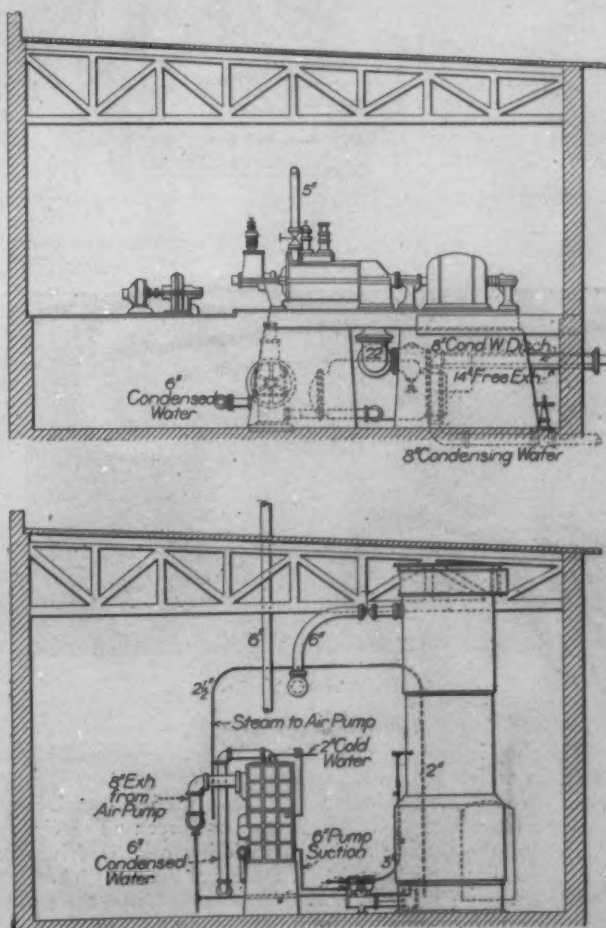


Fig. 16.—Sectional Elevations of the Power House Installation.

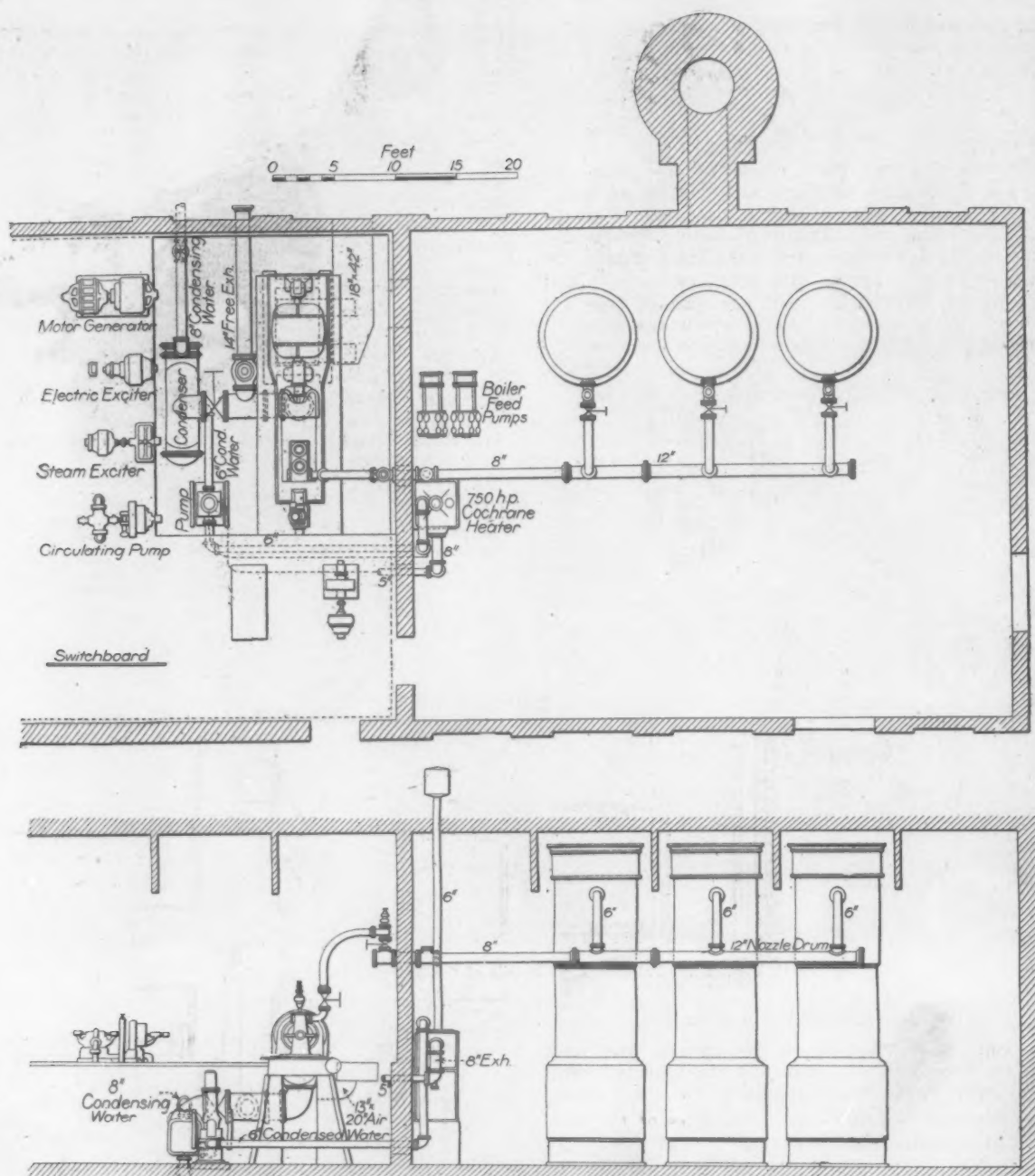


Fig. 17.—Plan and Elevation of the Power House Installation.

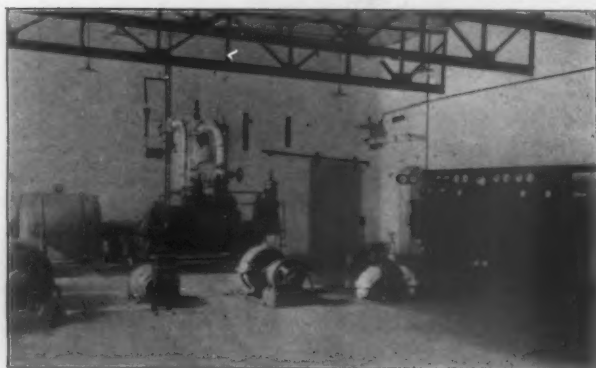


Fig. 19.—The Engine Room.

#### The Heating System

The shop is heated by the Evans-Almirall system of hot water, in which the water is heated under pressure. It passes through heaters built up of tubes, where it receives the heat from steam, either exhaust or direct. The circulation of the water through the heating coils is driven by a pump direct connected to a De Laval turbine. There are two heaters. The exhaust heater, so-called, uses the exhaust steam from the De Laval turbine, and a greater or less amount of steam taken from the Parsons turbine at

one of its intermediate stages, this steam not being permitted to attain its maximum expansion in the engine. An auxiliary heater is employed when the works are shut down, receiving live steam from the boiler, a circulation system being maintained between them.

An adjustable reducing valve secures a predetermined constant steam pressure in the exhaust heater. The temperature of the shop is controlled by changing the amount

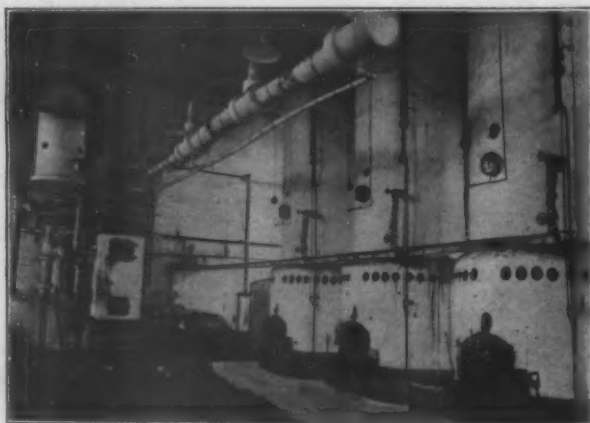


Fig. 18.—The Boiler Room.



of steam allowed to pass through the reducing valve, thus controlling the degree of heat in the circulating water, although the velocity of flow through the heating pipes can be governed to a considerable extent by varying the speed of the pump.

#### Errors of Design

In designing a great plant, new from one end to the other, containing many innovations, a certain percentage of error in design is certain, such as that of the pumping plant. Considering the magnitude of the undertaking and the fact that originality figures in so many details, the Windsor Machine Company has been fortunate in that there are no more mistakes to rectify, judging from the experience of the owners of most new works.

One other detail which was necessary to change was in

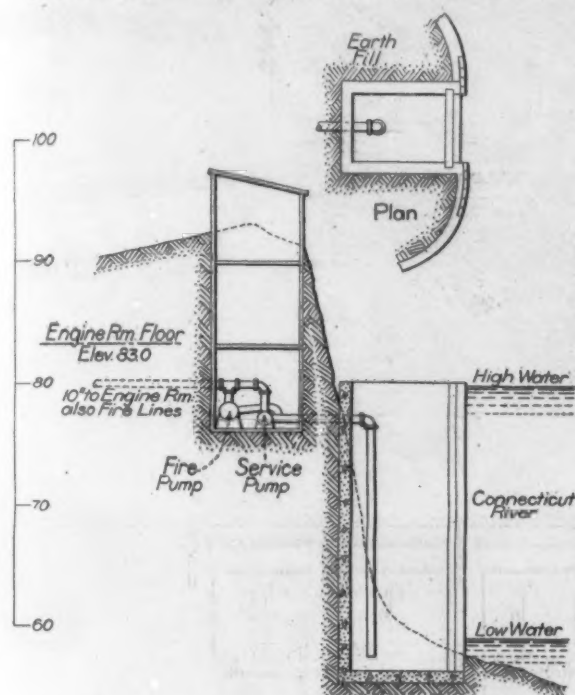


Fig. 20.—The Pumping Station at the River.

connection with the heating of the offices. The space under the floor was left open, and the timbers treated against decay. The hot-water heating pipes were placed beneath the floor instead of along the sides of the room as was first intended, and the result was so great a loss of radiation area that it became necessary to put in additional radiators. The management also makes the point that were another shop unit to be built hollow cast-iron columns would be used, through which the roof water would be taken instead of through conductor pipes. Referring to the offices, they are spacious, high studded, and admirably equipped for their purposes.

### The Moll Steam Trap for Heating Plants

For handling the condensation from heating plants and for boiler feed purposes a steam trap, bearing as a trade designation the Ideal tilting return steam trap, has recently been placed on the market by William Moll, 1664 Columbus road, Cleveland, Ohio. The apparatus has several distinctive features, the purpose being to obtain simplicity, durability and efficiency. A general view is given in Fig. 1, while Fig. 2 is a sectional view of the interior, showing the valves and valve-operating mechanism in a filling position.

The relief valve plunger E is open, kept in that position by the stem D, which is in contact with the cam A. Under these conditions no pressure exists and water enters the trap. When the reservoir is filled it tilts under its weight, and the water is discharged, while at the same time the cam A turns slightly, closing the relief valve and opening the steam valve plunger C2. The cam in turning first comes in contact with the valve operating lever B at the point A1, which gives the valve a slow but powerful start against high pressure. As the cam turns further the point A2 is in contact with the lever, and the valve opens

to its full capacity. This allows the live steam entering at H1 to flow through to the opening in the trunnion L and discharge the water.

The reservoir then tilts back to its filling position, the steam valve closes, the relief valve is opened and the trap is again ready to fill. The apparatus is placed above the boiler, so that when steam is admitted, equalizing the pressure in the trap and boiler, the water flows to the latter. Both the steam and relief valves close by gravity, doing away with the necessity of springs and weights.

The receiver, oval in shape, is of cast iron. The trap is mounted on a substantial machined iron base, assuring alignment. The receiver and the steam box are tested at 200-lb. water pressure. The former is counterbalanced by a cast iron counterpoise on the end of the lever. In its tilting motion the receiver strikes both above and below against a spring, preventing jarring and making the operation practically noiseless. The valves and valve operating mechanism are entirely inclosed in the steam box, where they are protected from damage and where they can be



Fig. 1.—The Moll Return Steam Trap.

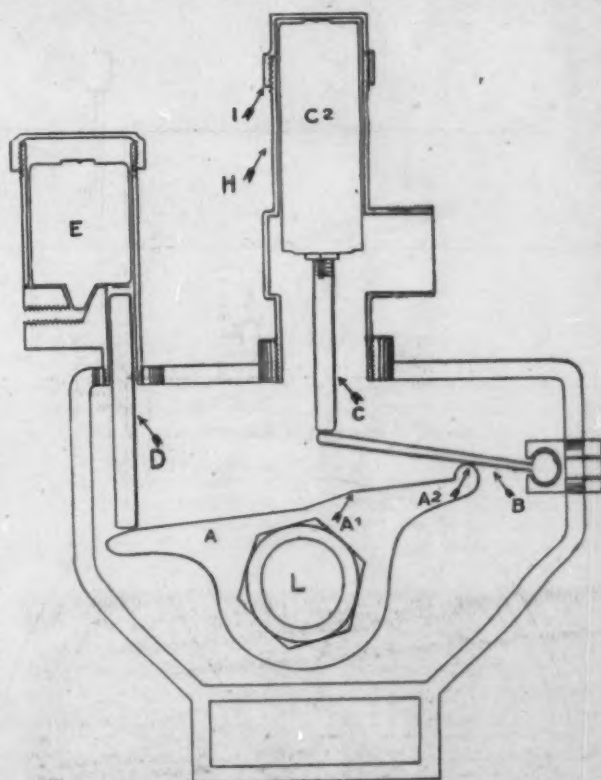


Fig. 2.—Details of the Moll Return Steam Trap.

reached quickly. By loosening two screws in the cover the steam box can be removed, exposing the entire valve and operating mechanism. The valves and trunnion are made of special bronze to insure the minimum amount of wear. The steam and relief valves are also of bronze. They can be taken out for inspection by unscrewing the caps, which have machined joints that require no packing. Lunkenheimer-swing check valves are used to control the inlet and the discharge.

The trap is made in four sizes. The smallest size, with a 1-in. water inlet and outlet and a 3/4-in. steam inlet, will drain 13,000 lineal ft. of 1-in. pipe, will discharge 350 gal. of water per hr. and drain 4333 sq. ft. of radiation. The largest size, with a 2-in. water inlet and outlet and a 1 1/4-in. steam inlet, will drain 50,000 lineal ft. of 1-in. pipe, discharge 1000 gal. of water per hr. and will drain 16,667 sq. ft. of radiation.

# A Poppet Valve Engine

A New Type Manufactured Under the Lentz Patent

A demand has existed for some time for more economical prime movers than have been hitherto built. This and the movement for the conservation of the country's resources has resulted in the investigation of various types of engines with a view to securing a prime mover of high quality and efficiency. The Erie City Iron Works,

this research work the company decided that the modified and improved poppet valve engine invented and developed by Hugo Lentz was the most economical and it secured the American manufacturing rights. The most interesting features about the engine are that no elastic packing is used throughout the engine—the valves maintain their

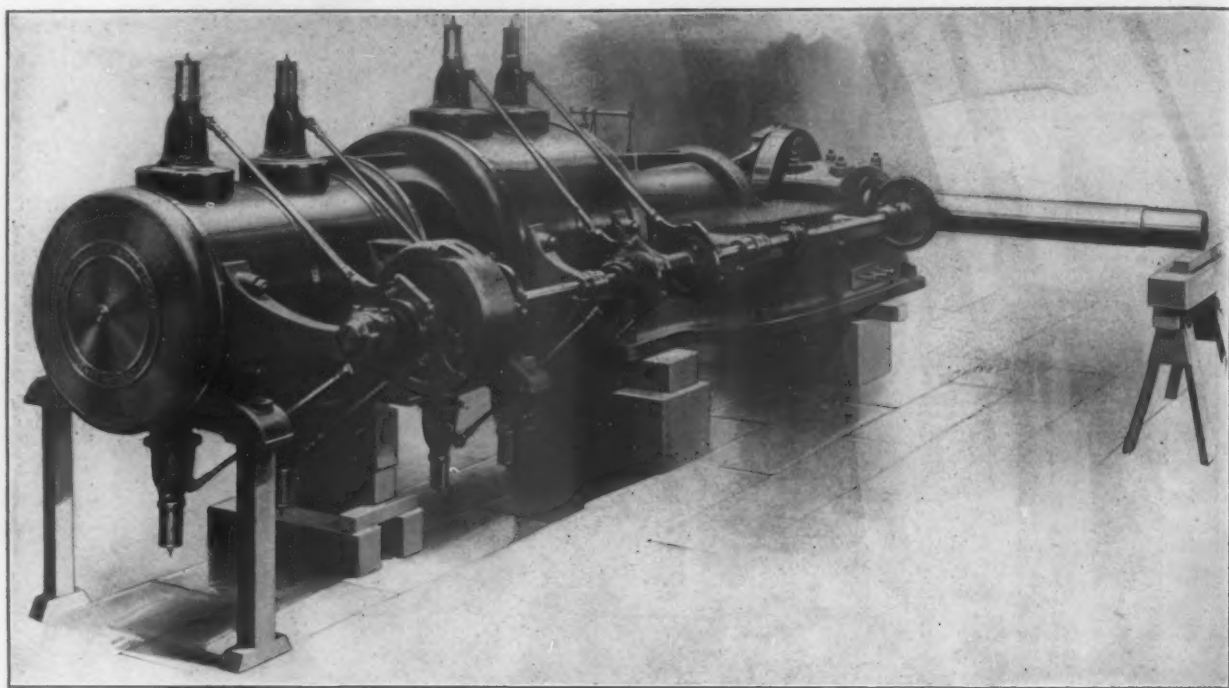


Fig. 1.—The Lentz Engine, Built by the Erie City Iron Works, Erie, Pa.

Erie, Pa., was one of the companies which undertook such an investigation and in its search steam turbines and internal combustion engines were both examined and finally the merits of the reciprocating engine using superheated steam were given consideration. As a result of

tightness indefinitely, a special type of mechanism for operating the valves and a simply constructed governor. Figs. 1 and 2 are an exterior view and a longitudinal section of the engine respectively, while Fig. 3 is a section through the stuffing box and shows how the elastic pack-

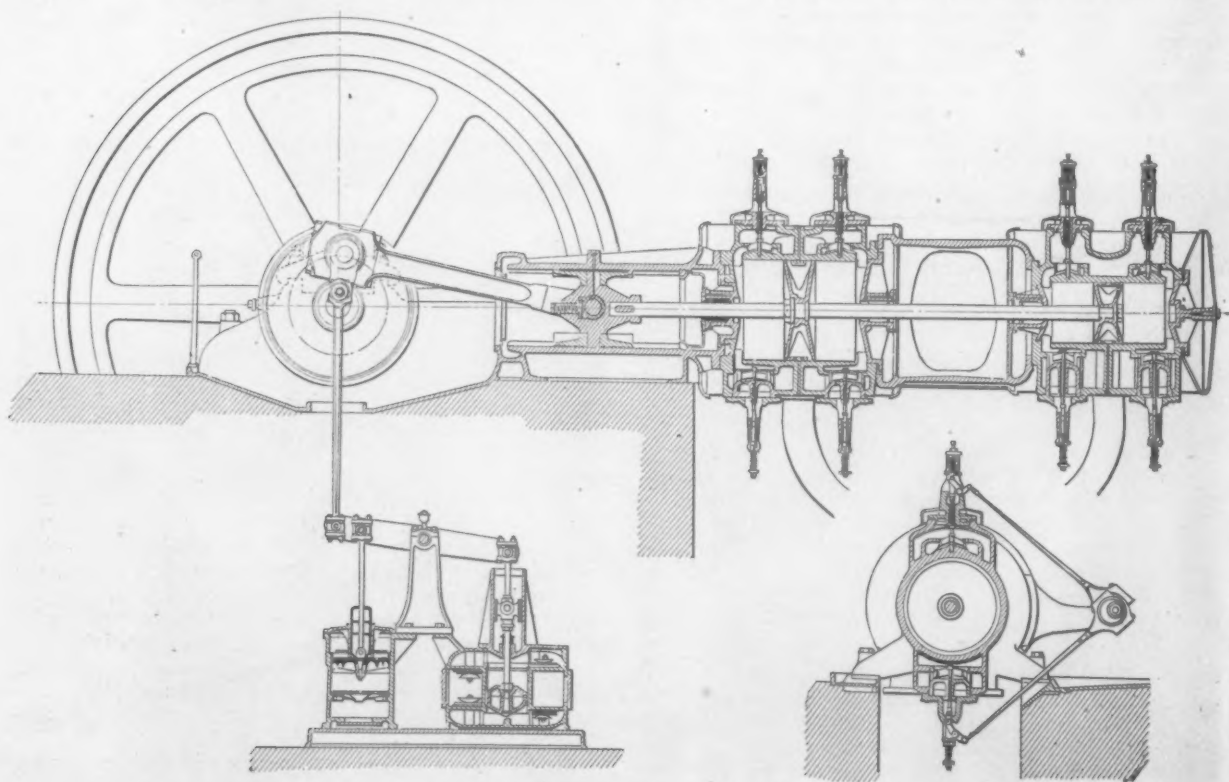


Fig. 2.—Longitudinal Section of the Engine.



ing ordinarily employed in an engine has been eliminated. The admission valve is illustrated in Figs. 4 and 5, the latter being a sectional elevation which shows a number of constructional details. A view of the various parts of

No elastic packing is used throughout the engine. The stuffing boxes which are shown in section in Fig. 3 are bored and ground to within 0.001 in. of the exact dimension and in them are placed a series of cast-iron rings, turned and ground to fit the stuffing box and accurately faced. These rings do not touch the piston rod. Interposed between them are five cast-iron rings having a square cross section which fit the piston rod to the same

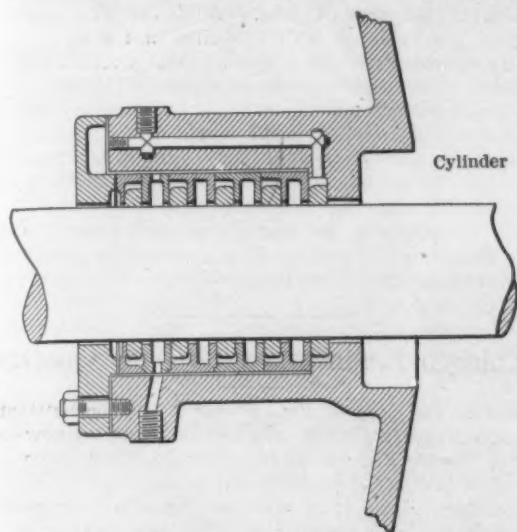


Fig. 3.—A Section Through the Stuffing Box.

the valve mechanism is given in Fig. 6, while the special type of governor is illustrated in Figs. 7 and 8, the latter being a transverse and an axial section.

#### The Engine in Detail

A longitudinal section of the engine is given in Fig. 2. As will be noticed, the framing is of the girder type with substantial feet to take the foundation bolts. The



Fig. 4.—The Admission Valve.

low-pressure cylinder is bolted to the frame and the high-pressure cylinder is secured to it by a distance piece. The feet of this cylinder are free to slide on the main frame with changes of temperature. The piston body is turned slightly eccentric so as to get a large bearing surface on the bottom of the cylinder.

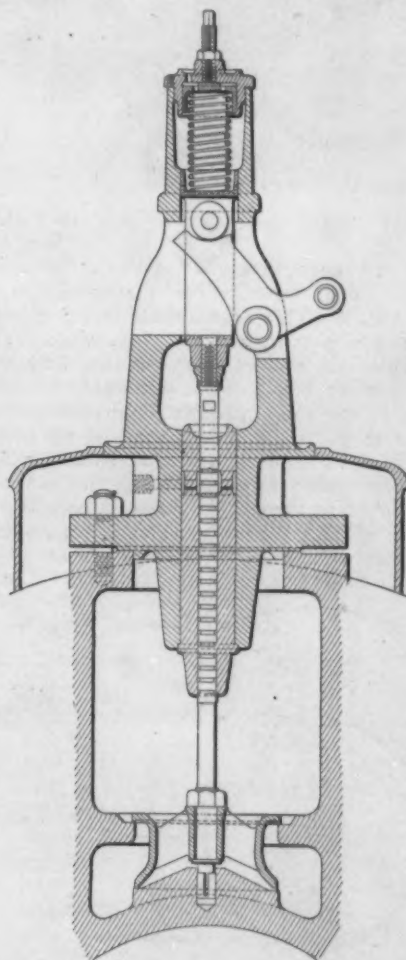


Fig. 5.—Sectional Elevation of the Admission Valve, Showing Constructional Details.

fraction of an inch. These are known as the floating rings. Oil can be kept circulating in the stuffing box if necessary, but water, the result of cylinder condensation, is sufficient to keep the box tight under pressure as great as 160 lb. These rings form a series of chambers, which are efficiently drained; any steam escaping from the front chamber enters the second one and expands there. A small part of this steam may escape to the third chamber and undergoes a further expansion, and so on; but the last ring it is claimed will never show the slightest leakage.

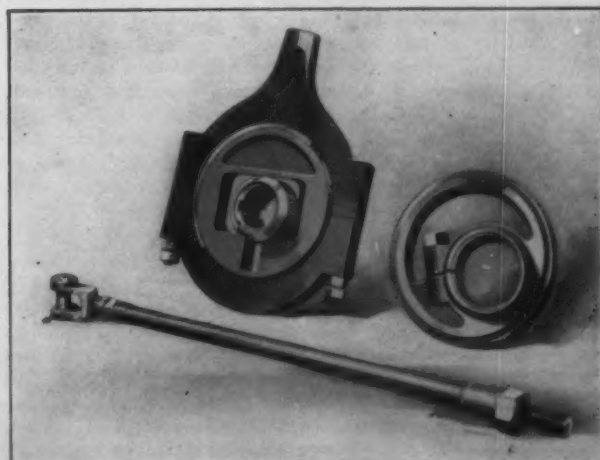


Fig. 6.—The Various Parts of the Eccentric.

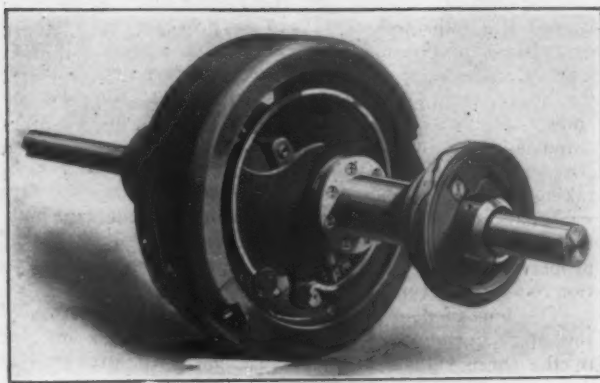


Fig. 7.—The Governor Used on the Lentz Engine.

The valve gear demands particular attention. An enlarged sectional elevation of the admission valve is given in Fig. 5. This is a double-seated poppet valve. The seats are not more than  $\frac{1}{8}$ -in. wide. The valve spindles which are ground to fit the long bushings shown have no stuffing boxes. The bushings are bored and ground to fit the valve spindles within 0.001 in., grooves are turned in the spindles and there is no trace of the leakage. The valves are turned to such diameters that the lower one will just pass through the upper opening. No dash-pots are used. The valve is moved by a cam acting on a roller. When the valve is seated the cam is not in contact with the roller, but the amount of clearance is too small to be shown in the drawing. The roller is

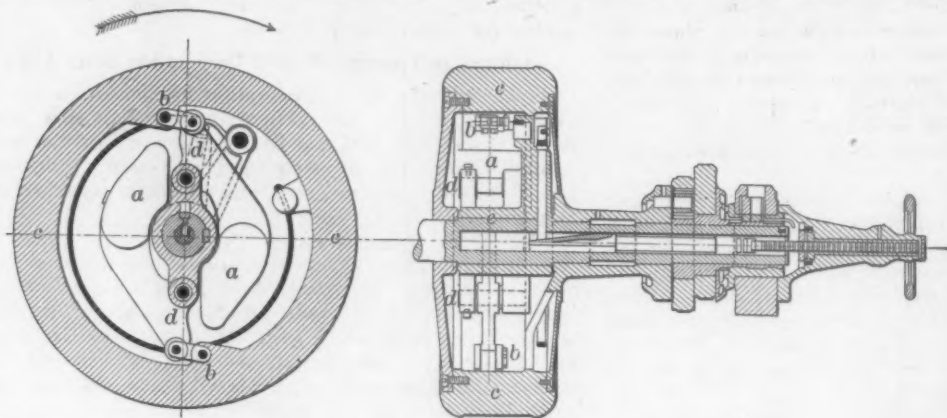


Fig. 8.—Transverse and Axial Sections of the Governor.

always in contact with the cam until the valve is seated and consequently the engine makes no noise when running at speeds as high as 200 r.p.m.

Alongside of the engine runs a horizontal lay shaft, shown at the right of Fig. 1, which is caused to rotate by a bevel gear between it and the crank shaft. This gear is very peculiar. In order to secure smooth running the gears constituting the drive are in the nature of friction cones and the shaft is driven by pressing the cones together. To prevent slip, however, teeth are provided, but these are very shallow, the points being turned off. The gears are inclosed in an iron case and run without noise. On the shaft are grouped eccentrics, one for each of the eight valves, the parts of which are illustrated in Fig. 6. The rods of these eccentrics are coupled directly to the ends of the cam levers as shown in the lower right corner of Fig. 1. The steam eccentrics can have their throw reduced to nothing by a wedge which slides in the shaft and in the eccentrics, and this wedge is moved by the governor to regulate the point of cut-off.

The governor, which is of a novel type, is shown in Fig. 7. Referring to Fig. 8, which gives the details of the governor, it will be noticed that there is a very heavy external inertia ring *cc*, and two centrifugal weights *aa*, which are controlled by flat bent springs that can be easily removed or replaced in a few minutes. The action of the governor shifts the wedge longitudinally, and so alters the throw of the eccentric. The two weights *a* are pivoted on a carrier *e*, keyed to the side shaft. These weights and the carrier are attached by a spring and a knee joint formed by *d* and *b* respectively to the outer ring *c*, which performs the functions of a fly wheel.

When the least change of load, and consequently of speed, takes place, the inertia of the outer ring which tends to keep its speed constant, causes it to move with relation to the carrier, and moving the eccentrics alters the cut-off to suit the change of load. With the new speed the weights are balanced by the spring in the new position and so maintain the new cut-off. This governor regulates within a short time and the momentary change in speed due to load being put on or off is only slightly in excess of the permanent one. A hand wheel is provided at the end of the shaft to enable the engineer to change the speed of the engine by altering the tension of the governor spring while the engine is running.

All the joints in the engine are of the metal to metal type, the required tightness being secured by grinding and the workmanship is high grade throughout.

### Chicago Engineers' Club New Quarters

Before the close of the summer it is expected that the Chicago Engineers' Club will be occupying its new house at 314 South Federal street, Chicago. For three years the club has been quartered in rooms leased from the Automobile Club. It is now moving into a property on which it has a 99-year lease. The new location adjoins the Union League Club, is within a stone's throw of the Post Office and affords the greatest possible advantages in its situation.

The building occupies a lot 25 x 100 ft. and is of brick and mill construction, seven stories. The façade will be finished in white stone, with gothic entrances and windows

on the street floor, and in red brick for the upper floors. The club entrance is at the north end of the building and gives access to an electric elevator which serves the entire structure. The first three floors have been leased by the club for a period of ten years to the St. Hubert's English Grill Company, which is under contract to serve the club a table d'hôte luncheon and an à la carte service. There is a separate entrance at the south end of the

building for the Grill Company, so that there can be no confusion of identity between the club and its tenants.

The third floor banquet room is to be reserved for the exclusive use of the Engineers' Club members between the hours of 11 a.m. and 3 p.m., and the noon meal, table d'hôte and à la carte will be served in this room.

In front there is a small reception room. A hallway leads into the club or lounging room, which is a long room with a beamed ceiling, having windows opening on the south and a large fireplace on the north. Opening off the lounging room at the west end, and separated from it by a folding glass partition, is the card room, a large light, airy room with windows opening on the south and west.

The fifth floor is to be finished in loft form and left vacant for further expansion. It will be utilized for billiard and club rooms when the need becomes apparent and further funds are available. The sixth and seventh floors each have seven bed rooms and three bath rooms.

The club will have in its new home ample and pleasant quarters, with plenty of room to expand and an investment that is expected to give it a comfortable surplus within a decade.

The Lake Superior Mining Institute will hold its sixteenth annual meeting on the Menominee range August 22 to 24. Arrangements are now under way for the entertainment of the members, and circulars will be issued giving the itinerary of the trip and the list of papers to be read. W. J. Richards, Crystal Falls, Mich., is president, and A. J. Yungbluth, Ishpeming, Mich., is secretary.



## The Government Report on the Steel Corporation

### Familiar Ground Traversed

An abstract is here presented of the report which Herbert Knox Smith, commissioner of corporations, has submitted to President Taft, covering his investigation of the United States Steel Corporation. The report is a rather voluminous document, covering 60 pages of closely printed matter, and deals with:

1. The marked development of consolidation, culminating in the organization of the Steel Corporation.
2. Capitalization by the Steel Corporation far in excess of property values. The bureau's valuation of tangible assets in 1901 is \$682,000,000, against \$1,400,000,000 of issued securities.
3. An analysis of cost of subsequent additions to property of the corporation, showing a total investment in tangible property December 31, 1910, of \$1,187,000,000, against \$1,468,000,000 outstanding securities.
4. An average rate of profit from 1901 to 1910 on the corporation's actual investment, as computed by the bureau, of 12 per cent.
5. An almost continuous decrease in the corporation's proportion of output of principal steel products, but a marked increase in its ownership or control of iron-ore deposits.

#### Development of Consolidation

The transformation in the steel industry was simply one phase of a movement toward industrial consolidation, characterized by three especially important features:

1. The restriction of competition through combination.
2. Integration, the linking up of productive processes through acquisition under one control of raw materials and manufacturing plants and through extensions and co-ordination of manufacturing processes.
3. The creation of a great amount of inflated securities.

The first undoubtedly was the principal cause of most consolidations in the steel industry. Profits had been sharply reduced by the competition which accompanies the depression of the middle nineties, and steel manufacturers were attracted to consolidation as a means of increasing returns. However, a desire to secure greater economies and advantages through integration undoubtedly played an important part. A conspicuous feature was the acquisition by iron and steel manufacturers of extensive reserves of ore and coal. The great bulk of the iron-ore deposits of the Lake Superior region had by 1900 passed under control of less than a dozen interests, chiefly steelmaking concerns. The most desirable coking-coal fields of the East had been secured, largely by the same steelmaking interests.

Such integration and co-ordination made possible the introduction of economies in manufacture, particularly in saving of fuel and labor. In considering general causes which led to consolidation, therefore, this element of integration should be given due weight.

The creation of new securities for the sake of a stock-market profit was a very important consideration. The public demand for such securities was unusually active at this time. So long as the demand for such issues was maintained, the supply was steadily increased.

The familiar history is given of the aversion of the threatened "steel war" in 1901 by the formation of the Steel Corporation.

#### Capitalization and Investment of the Steel Corporation in 1901

The bureau's valuations of the Steel Corporation's property in 1901, arrived at by three different methods, are compared with its outstanding capitalization in 1901 in the following table:

	Excess of securities over estimates.	
Total capitalization, April, 1901, including underlying bonds and purchase money obligations.....	\$1,402,846,817	
Investment in tangible property alone..	676,000,000	\$726,846,817
Value of all property, tangible and intangible, as indicated by market prices of securities of constituent concerns .....	793,000,000	609,846,817
Value of tangible property estimated by departments of the business.....	682,000,000	720,846,817

\*Excluding \$535,407 unacquired stock in concerns for which no corresponding deduction was made in the first and third estimates.

The securities issued by the corporation greatly exceeded the indicated value of the property acquired, as established by any one of the three methods of valuation. The valuation of the tangible property arrived at by historical study, as well as that by departments of the business, shows an excess of capitalization greater than the indicated value itself. The valuation by departments, namely, \$682,000,000, shows an excess of nearly \$721,000,000. Even taking the indicated market value of the securities of the subsidiary concerns, \$793,000,000, which includes the public estimate for intangible considerations as well as physical property, the excess of the Steel Corporation's capitalization was still over \$609,000,000.

The bureau does not contend that the capitalization of the Steel Corporation should have been fixed at any one of the three valuations here presented. All attempted at the moment is to compare these valuations with the capitalization. Figures show that the entire issue of approximately \$508,000,000 of common stock of the Steel Corporation in 1901 had no physical property back of it, and also a considerable fraction, say from one-fifth to two-fifths, of the preferred stock was likewise unprotected by physical property.

While, therefore, it is not the purpose of this report to say what should have been the capitalization of the Steel Corporation, it is obvious that the company was heavily overcapitalized, judged by any reasonable standard. Further, this overcapitalization is indicated by the fact that the underwriting syndicate got a commission of common and preferred stock amounting to \$130,000,000 upon which the syndicate realized \$90,500,000 with a net profit of \$62,500,000, of which \$12,500,000 went to managers and \$50,000,000 to members. This was clearly unreasonable. Further, \$20,000,000 more was paid by constituent companies for underwriting services.

#### Additions to Property of Steel Corporation Since 1901

Since 1901 the Steel Corporation has increased its investment first, and most important, through new construction and additions out of surplus earnings and new capital from sale of securities; and, second, through acquisition of competing concerns through issue of securities directly.

The bureau has computed the actual investment of the Steel Corporation in its various properties at the close of 1910 at \$1,186,982,038. This compares with a total valuation April, 1901, of \$682,053,385. In other words, during the period from April, 1901, to December 31, 1910, the corporation has made an additional net investment of \$504,928,653. Of this \$435,000,000 was provided from earnings. These amounts are over and above the allowance for maintenance and depreciation. This has eliminated a considerable amount of the "water" in capitalization.

The total net capitalization December 31, 1910 (including purchase money obligations and mortgages, but excluding \$620,352 par value of stocks of subsidiary companies not held by Steel Corporation) was \$1,468,033,260. The excess of capitalization over indicated investment (\$1,186,982,038) was \$281,051,222, whereas at its organization in 1901 the disparity between the two figures was \$720,846,817.

The Steel Corporation undoubtedly would contend that there was not a disparity of \$281,000,000 between its capitalization and actual value at the close of 1910. In its balance sheet of December 31, 1910, total assets (after deduction of current liabilities) were of approximately \$1,693,000,000, or, \$225,000,000 over capitalization as above stated. Of this excess \$164,000,000 was surplus and the balance sundry reserves. This balance sheet valuation is about \$500,000,000 in excess of the investment as computed by the bureau.

It is true that the merger value of various properties acquired, taken together with the organization of this company as a going concern, have a value in excess of the sum of their values. Co-ordination made possible by combination under single control tends to reduce costs through economies or removing the necessity of paying profits to others. To allow a single company, which has secured the bulk of a given industry, credit for such merger value, as a basis on which to earn profits, raises, therefore, a question of far-reaching public policy. Because of the vital issue involved, as well as because of the practical consideration of establishing an investment

which shall permit of intelligent discussion of profits, the bureau, while admitting there is an element of merger value in a going concern, either from great concentration of control, monopolistic power, or other influences, has made no addition therefor to the investment of the Steel Corporation.

#### Profits of the Steel Corporation

Profits earned upon the investment of the Steel Corporation, as computed by the bureau (not on the capitalization), have averaged 12 per cent. for the entire period from 1901 to 1910. The extreme range was from 7.6 per cent. in 1904 to 15.9 per cent. in 1902. By profits is meant net before charges. The average for the first four and three-fourths years was 12.5 per cent., as against 11.6 per cent. in five years from 1906 to 1910. Therefore, in so far as any tendency may be noted, it is toward a lower rate of profit in recent years. The profit fell to 7.6 per cent. on investment in 1904 and 7.8 per cent. in 1908, as compared with a maximum of over 15 per cent. in 1902 and 1906. Prior to the formation of the corporation the industry was noted for violent changes in the rate of profit. This exhibit shows that business, although still subject to marked fluctuations in profits, has, even in the most depressed years shown a substantial return on actual investment.

#### Position of the Steel Corporation in the Industry

The Steel Corporation, despite its size, is not exempt from competition. Indeed, competition in the industry has steadily been increasing. Notwithstanding the great additions made to its properties from earnings and the acquisition of competing concerns, its proportion of the business in nearly every product except pig iron and steel rails is less than it was in 1901. Taking the production of steel ingots and castings as a basis, the Steel Corporation's percentage of the total output in the country fell from 65.7 per cent. in 1901 to 54.3 per cent. in 1910. This figure, perhaps, is the best single criterion by which to judge the change in the corporation's position in the steel industry from a producing standpoint.

While the corporation's proportion of the production of both raw materials and finished products shows a marked decrease, the proportions given do not fairly represent its true position in the industry as a whole. In iron ore, in particular, it undoubtedly occupies a dominating position. Its holdings for the whole Lake Superior region in 1909 were reckoned at about 1,625,000,000 tons, or 75 per cent. of whole, of which 1,258,000,000 tons was of the current commercial standard.

It also has a large amount of low-grade ore in the South. Altogether, it holds about 2,500,000,000 tons.

Not only on account of its great holdings of ore, but also on account of peculiar advantages enjoyed in the transportation of the ore the Steel Corporation occupies an extremely commanding position in the iron and steel industry. Indeed, in so far as its position is of monopolistic character, it is chiefly through its control of ore holdings and the transportation of ore.

The Great Northern Ore lease, on account of the royalties provided therein, has often been referred to as an indication of the increased value of Lake ore. While the average royalty which will actually be payable under this lease will depend on the quality of ore shipped, indications from the royalties on shipments to 1910, inclusive, are that the average iron content will not fall much below a 59 per cent. grade of ore.

A royalty of 85 cents, with annual increases of 3.4 cents, is absolutely unprecedented in the Lake ore trade. There is no indication that either the average quality of ore on the Hill lease or the costs of mining it justify the payment of exceptionally high royalties. The royalties stipulated in the Hill lease, therefore, were and are still far above the market value.

The high royalty named in this lease, therefore, instead of being indicative of marked enhancement in ore values, is evidence of the extent to which the Steel Corporation was willing to go to prevent this ore from falling into the hands of rival interests.

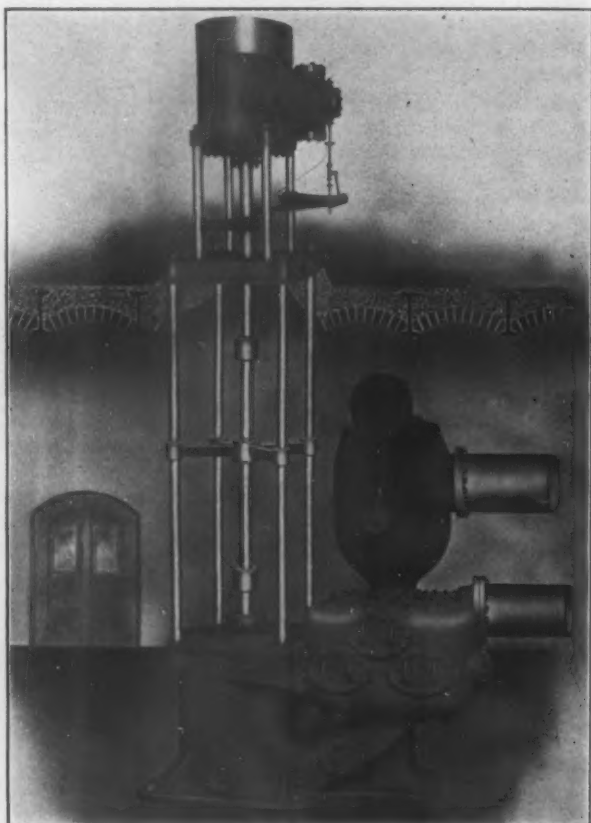
R. W. Oswald, Pittsburgh representative of the Pennsylvania Boiler Works, Erie, Pa., recently sold to the Fort Pitt Coal Company, Pittsburgh, 150 hp. boilers and the W. J. Rainey Coke Company, Uniontown, Pa., 125 hp. boilers.

## A Special Air Pump and Jet Condenser

The vertical air pump and jet condenser shown in the illustration is built by the Dean Bros. Steam Pump Works, Indianapolis, Ind. It is of a special design for use where the engine room floor is too high vertically from the water supply to permit the application of standard practice. With this apparatus the distance from the air cylinder to the steam cylinder can be made to suit the conditions under which it is to be run, producing, it is claimed, an efficiency equal to that where the steam and air ends are closely connected. The objective is to condense the steam exhausted from the engine and at the same time give a vacuum in the cylinder of 26 to 28 in.

The air cylinder and condenser are placed within easy reach of the condensing water, while the steam end and the valve movement are always in view of the engineer. No additional steam is required than when the steam and air ends are closely connected. Adjustment may be made to procure a regular movement of the apparatus. In one extreme case the distance from steam to air was 50 ft. The straight push and pull movement with no side strains insures durability.

The steam end may be either simple, as shown in the cut, or compound, depending on the conditions of opera-



The Dean Bros. Steam Pump Works' Vertical Air Pump and Jet Condenser.

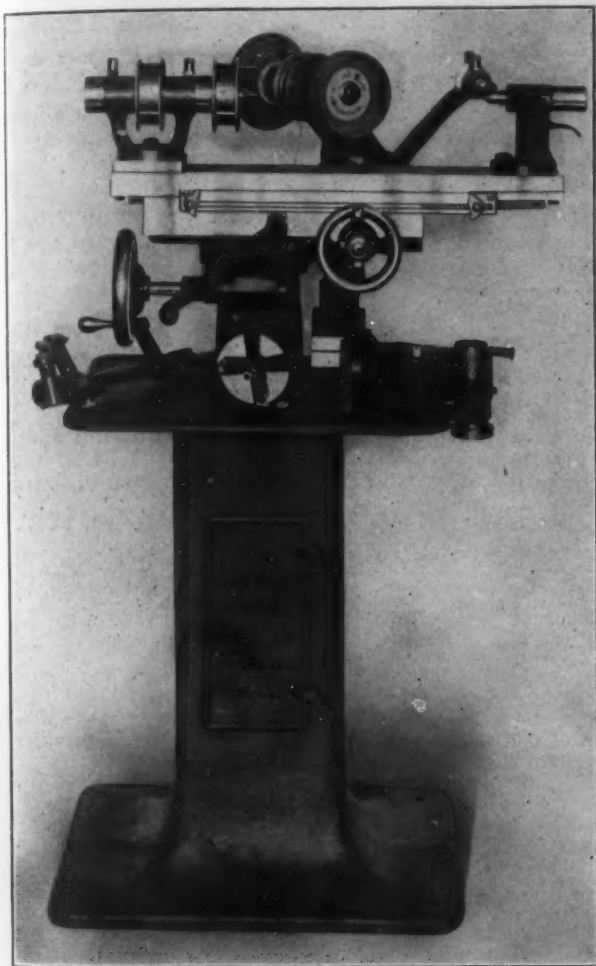
tion. The apparatus is made in sizes from 60-in. diameter air cylinder by 48-in. stroke down to 8-in. diameter air cylinder by 7-in. stroke. The side rods are accurately finished, bringing all parts in alignment. The piston rods are coupled with taper fits in steel couplings and are held in position by taper tool-steel keys. The air cylinder is lined with brass. All valves are in the valve chest at the side, where they are easily accessible through handhole openings. As there is no reason for getting at the cylinder bore except for replacing the packing around the air piston, it requires little attention. The steam end is made to stand easily a working pressure of 250 lb. and steam containing 150 deg. superheat.

The Asbestos Protected Metal Company, Beaver Falls, Pa., has opened its new plant for the manufacture of asbestos protected metal and weatherproof non-rusting skylights. The executive offices of the company have been removed to the works, and all communications should be addressed to Beaver Falls.



### A Combination Grinding Machine

The motor-driven grinding machine shown in the illustration, built by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., is a combination machine arranged for dry grinding at one end and as a complete



The Bridgeport Combination Grinding Machine.

twist drill grinder at the other. The motor, of the alternating current type, is fully inclosed to keep out flying particles of abrasive. The heavy base is carried out wide

grinding attachment is built by the Washburn Shops, Worcester, Mass. and may also be used mounted on the Bridgeport No. 1/2 and No. 2 machines. The motor is of ample power to run wheels 12 in. in diameter. The specifications are as follows:

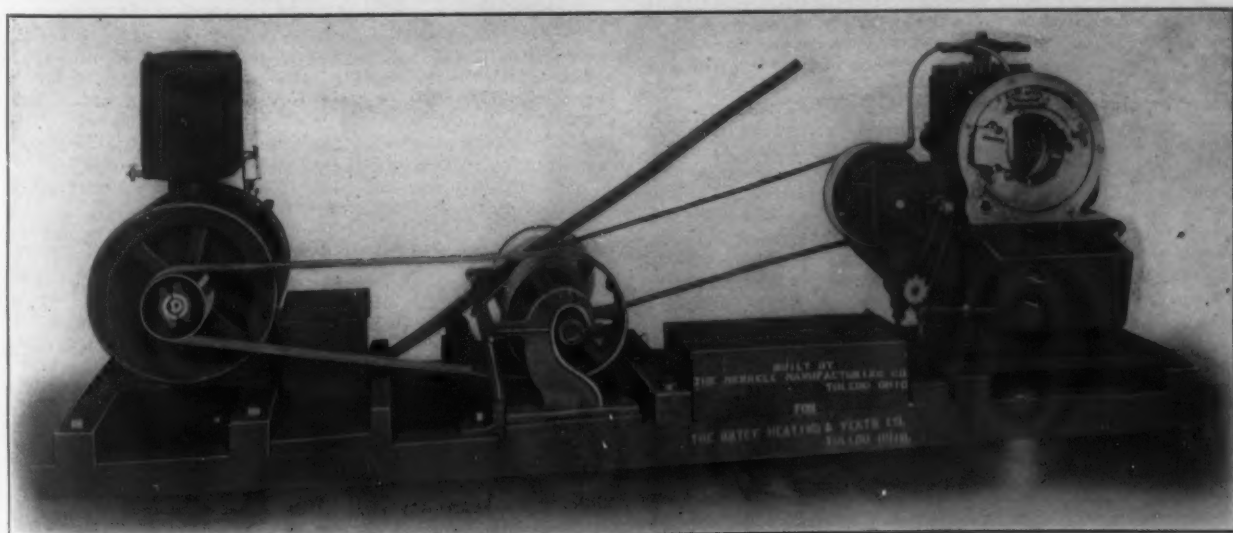
Height from floor to center of spindle.....	40 in.
Length of ring-oiler bearings.....	8 in.
Diameter of spindle in bearings.....	1 3/4 in.
Diameter of spindle between flanges.....	1 3/4 in.
Distance between wheels.....	33 1/2 in.
Length of spindle.....	43 3/4 in.
Floor space.....	24 by 20 in.
Weight.....	650 lb.

**Toncan Metal.**—In an address delivered before a sheet metal workers' association at Baltimore, Md., by A. H. Lovejoy, the subject of the causes of corrosion in modern steel and iron sheets was discussed and the good qualities of Toncan metal were set forth. A brief outline of how the lasting and working qualities of this metal are obtained was given as follows: "To overcome the trouble of pitting, in the making of Toncan metal no manganese is added during any of the several stages of its manufacture, and, through the system employed, all excess quantities of this element already present in the raw materials are eliminated, together with all excess sulphur and phosphorus, the result being that in the finished product there is no collection of these elements scattered throughout the metal to form into pits and eat into holes." Toncan metal is made by the Stark Rolling Mill Company, Canton, Ohio.

### A Portable Pipe Machine

The portable power pipe threading and cutting machine, which is shown in the illustration, has been brought out by the Merrell Mfg. Company, Toledo, Ohio, to supply a demand from heating and plumbing contractors. They require a power machine that can be used on the job in a building where considerable cutting and threading is necessary in the installation of pipe, a large saving of labor resulting as compared with hand threading. The machine is also designed for use in the installation of automatic sprinkling systems.

The outfit consists of the company's power threading and cutting-off machine mounted on an oak skid with a 2 1/2-hp. gas engine, the power being transmitted to the machine through a countershaft. The pipe threader itself is mounted directly on a special low base, which makes it light and convenient to handle. The entire outfit occupies a floor space of 3 by 10 ft. and weighs 1600 lb. With the use of rollers it can be easily loaded on a wagon and taken where wanted, or moved about a building. A box



The Merrell Portable Pipe Threading and Cutting Machine.

enough so that the bearings may be bolted to the main body casting. The long bronze bearings, of the split sleeve, ring-oiling type, are movable and renewable. If the spindle should in time become worn it can be redressed and bronze bearings bored out, correspondingly small. The twist drill

for tools, dies, etc., is conveniently located in the space between the threader and the countershaft. The illustration shows one of the company's 6-in. threaders. The outfit is also furnished with pipe machines of 4, 8 and 12-in. capacity.

## The Machinery Markets

The railroads are becoming more active in some sections. The New York Central expects to close out about \$50,000 worth of business within the month, and in Chicago the Atchison, Topeka & Santa Fé Railroad has closed out for \$25,000 worth of equipment, about four-fifths of which was awarded to the Chicago branch of a large New York machine tool house. Government purchases have helped the machinery trade a great deal, as a large number of bids for metal working machinery were opened during the week and awards will be announced within a few days. An improvement in nearly all lines is noted in Cleveland and a similar condition exists in Cincinnati. The automobile manufacturers continue busy in Detroit and the machinery demand there is growing. The call for electrical equipment has increased in St. Louis and the general market there is improving. A more satisfactory volume of business is coming forward in New England and a better feeling has developed in Philadelphia, although the market there is irregular. Business in Baltimore is not up to normal, but it has grown of late. Cheerful reports come from Texas, where the prospect of a large cotton crop is helping business sentiment. Texas dealers are also selling a good deal of mining equipment for delivery in Mexico.

### New York

NEW YORK, July 5, 1911.

The New York Central Railroad has received all the bids on the list it had out for its West Albany shops and assurance has been given to the bidders that contracts will be awarded within a month. This will mean the distribution of about \$50,000 worth of orders. The Newark, N. J., Board of Education has bids in on about \$17,000 worth of equipment for a new manual training school, and this business will also be closed during the present month if plans of those in charge are carried out. Later on an additional machine tool list is expected from this source for equipment for the new Central Manual Training & Commercial High School, which will be about equal in size to the one on which dealers have just put in their bids. With this business in sight a better month is expected than was experienced in June, when orders were not as plentiful as inquiries warranted dealers to expect. A better volume of inquiries developed during the week and a number of new enterprises which will call for considerable machinery buying came up. Automobile manufacturers and public garage owners have been buying more liberally during the past week and while no large lists of machinery are before the trade the outlook is decidedly more encouraging than it was a week ago.

An enterprise that will call for large expenditures for machinery, especially in the line of machine tools and metal working equipment, is that of the Edison Company, West Orange, N. J., to establish two new plants in Silver Lake, near West Orange, for the construction of storage batteries and industrial automobiles. A large dismantled factory at Silver Lake, which was formerly used as a licorice works, has been purchased by Thomas A. Edison and his associates and it will be remodeled and additions constructed. The plant of the Federal Storage Battery Company, now opposite the Edison Works at West Orange, will be moved to Silver Lake, together with that of the Lansden Company, which now has an electric automobile plant on Orange street, Newark. The Edison Company has large interests in both of these companies and it is understood that arrangements are to be made to extend their manufacturing facilities.

Final contracts for the construction of nearly 18 miles of tunneling from Yonkers, N. Y., to Greenpoint, Brooklyn, in connection with the extensions of the New York water supply have been awarded to four large contracting companies and they are now making arrangements to purchase air compressors and other equipment needed in the construction work which is about equally divided among them. The sections awarded and the contractors' addresses are as follows: Section 63, Mason & Hanger Company, Cornwall, N. Y., or H. B. Hanger, Hotel Astor, New York; Section 65, Pittsburgh Contracting Company, Elmsford, N. Y.; Section 66, Grant, Smith & Locker, 25 West Forty-second street, New York, and Section 67, Holbrook, Cabot & Rollins, 331 Madison avenue, New York.

A number of New York machinery houses are bidding on equipment for a large sugar mill to be installed at Occidental Negros, P. I., in which a number of Hawaiian capitalists are interested. The mill, which is to be capable of handling 20,000 tons of cane a day, will be equipped with three sets of rollers, in addition to other crushing equipment. Y. H. Lambert, who is now located in Hawaii, has been conducting the negotiations for the necessary machinery, and the enterprise includes the establishment of an electric light plant, an ice plant, telephone system and about 20

miles of industrial railroad. About \$1,000,000 gold will be spent and construction work is to begin very shortly.

The W. A. Wood Automobile & Mfg. Company, Kingston, N. Y., which has purchased considerable machinery in this market of late, is inquiring for additional machine tools. This company is building the Comer industrial truck and the Guy Vaughan pleasure car.

The Bagley & Sewell Company, Watertown, N. Y., is planning the erection of a new factory building, of brick construction, to cost approximately \$40,000. The plans are not as yet complete, and it is not certain as to whether the building will be erected this year or not.

The Osgood Scale Company, Binghamton, N. Y., has had plans prepared for the erection of a brick and concrete building, 50 x 150 ft., three stories, of mill construction. The plant is designed to be thoroughly fire-proof and will be equipped with an automatic sprinkler system, electric elevators, etc.

J. M. Betton, manufacturer of Drucklieb injector sand blast apparatus in all forms, will remove about July 10 from 178 Washington street to 14 Park Place, New York.

The Unit Brick Company, Schenectady, N. Y., will build a one-story factory building and boiler house 60 x 149 ft., and a two-story office building 40 x 44 ft.

McCleary, Wallin & Crouse, Amsterdam, N. Y., are having plans prepared for a seven-story and basement factory building 80 x 200 ft., of structural steel and reinforced concrete construction, which they will build this summer.

The Empire Last Company, 130 Mill street, Rochester, is preparing plans for a factory building which it will erect on Palmer street.

The Ellsworth Collieries Company, Ellsworth, Pa., a subsidiary company of the Lackawanna Steel Company, Buffalo, has completed plans for the building of a central plant for generating and distributing electric power to the several mines operated by the company. Most of the equipment of the plant has been ordered from the General Electric Company and includes one 1750-kw., 60-cycle, 2300-volt generator, driven by a mixed pressure Curtis turbine and one 300-kw., 60-cycle, 2300-volt belt-driven generator.

### New England

BOSTON, MASS., July 3, 1911.

Organized investigation of the condition of business in the metal industries revealed the fact that a great many concerns are receiving an entirely satisfactory volume of orders. These may be exceptions, but, on the other hand, their number is large. It is also true that they represent a wide variety of industries. The statement of one manufacturer is suggestive, that "while from reports we get, business is a little quiet, although on the increase since the first of June, we have been very busy." The experience is a common one. Manufacturers who themselves are running their works full are lead by common report to believe that they are very much the exception. It is true that most machine manufacturers find business dull, although in not a few cases some improvement is noted. Many of their customers, though probably not a majority, are running their equipment at full capacity or nearly so. It will take no great increase in demand to compel many shops and factories to go into the market for machinery, in spite of the fact that capacities are very



## THE MACHINERY MARKETS

much greater than they were in 1907. A manufacturer of cranes and hoists states that he finds business very good indeed. A builder of pipe threading and cutting machines reports that business for the last six months has been the largest in the company's history, and that the outlook is good. A steam pump house states that this has been an excellent year for business so far. A maker of metal lockers and shelving has been running full for six months, with orders still on the books to insure a continuation of the condition for some time. These experiences are typical of a considerable element in the metal trades. It cannot be emphasized too strongly that business is in such shape that no very great change in the market will be necessary to put it on a rush basis. In the meantime the dealers are not finding any material improvement, nor had they expected to during the hot weather. They look to the autumn to see a smart revival.

The Sprague Meter Company, Bridgeport, Conn., manufacturer of cast-iron gas meters, has prepared plans for a two-story and basement brick and steel building, 61 x 151 ft., as an addition to its present factory. The company has purchased a plot of land adjoining the site of the present and proposed buildings to permit of still further extensions which will probably be necessary in the near future. The increase in capacity has been made necessary by the very rapid increase in the demand for the company's product.

The Terry Steam Turbine Company, Hartford, Conn., states that it will eventually be in the market for new machinery for the addition to its works, but is not ready to consider this matter at the present time. The new building will be 82 x 236 ft., making a total building of 82 x 436 ft. Ground will be broken this week.

The New Departure Mfg. Company, Bristol, Conn., will erect an addition 30 x 82 ft., two stories, which will be used for a testing laboratory.

The McNab Company, Bridgeport, Conn., has been incorporated with a Connecticut charter to take over the business of the McNab Indicator Company, manufacturer of indicators and registers for vessels under patents issued to Alexander McNab. Henry Bishop is president, F. J. Kingsbury, Jr., vice-president, and Norman Leeds, secretary and treasurer. These instruments have proved a success, and the purpose of the new company is to put them on the market in the proper way with several other devices the American agency for which Mr. McNab has recently secured in England.

The Lester & Wasley Company, Inc., Norwich, Conn., manufacturer of envelope machines, has organized with Fred W. Leeds as president; Howard L. Stanton, vice-president; Frank H. Allen, secretary; Percy Chapman, treasurer.

The Dunbar Bros. Company, Bristol, Conn., manufacturer of oil tempered springs, is considering the installation of additional automatic spring machinery.

The New York, New Haven & Hartford and Boston & Maine Railroads have taken the initial steps toward the creation of a tunnel beneath Boston Harbor, connecting the Boston & Maine terminal at East Boston with the New Haven system just outside of the South Station. A bill has been introduced in the Massachusetts Legislature providing for the right to proceed with this work. It includes the electrification of the Boston & Maine system as far as Beverly, Mass., and of the New Haven system as far as Readville, Mass.

George L. Riggs, 35 Congress street, Boston, formerly of Waterbury, Conn., has purchased from the Industrial Instrument Company, Foxboro, Mass., the business of the Standard Electric Time Company, manufacturer of electric clocks which are regulated from central master clocks. The business was formerly located at Waterbury, and it is possible that the factory still owned by the company in that city will be opened for some of the operations of manufacturing.

Additions to general manufacturing plants in New England include the following: Walpole Rubber Company, Walpole, Mass., a large plant at Providence, R. I., on a site just purchased, tentative plans only having been made; Crown Mfg. Company, Attleboro, Mass., cotton mill to cost \$100,000; Cheney Bros., South Manchester, Conn., building to connect two mills, 28 x 56 ft., four stories; Oxford Paper Mill, Rumford, Me., two finishing buildings, one 75 x 96 ft., the other 70 x 200 ft., a machine building, 163 x 216 ft., and a beater building, 75 x 215 ft., the improvements to cost \$500,000; Interlaken Cotton Mills, Harris, R. I.,

large addition; Bay State Brick & Steel Company, Springfield, Mass., brick, steel and concrete building, 45 x 244 ft., two stories.

W. A. Clinton and F. P. Lyons have purchased the business of the Hartford Iron Works, Hartford, Conn., manufacturer of architectural and ornamental iron works.

### Philadelphia

PHILADELPHIA, Pa., July 3, 1911.

While the market is still somewhat irregular quite a few merchants as well as manufacturers report the volume of business in June to have been somewhat larger than that of the previous month. Prospective buyers show a little more confidence in the business situation and in instances have placed orders which have been pending for some time. The general run of business has, however, been confined to single tool propositions. There has been a pronounced absence of railroad business, but it is believed that with the greater activity in railroad buying of track and motive power equipment it will not be a great while until purchases of shop equipment will develop. A considerable tool programme has been under consideration for months by some roads, but authority to make purchases has been lacking. With the opening of the fiscal railroad year a better buying movement is anticipated. Business during the week has not been very active, as might be expected on the eve of the national holiday. Many establishments shut down their plants from Saturday till Wednesday, making needed repairs in the interim. Merchants have also been observing the holiday, with the result that the week's business will be somewhat curtailed.

The demand for second-hand machinery has been quieter, due to the general conditions in the trade at this season. Moderate inquiries for power equipment still come out, but prospective buyers do not appear to be in any great haste to place orders. Steel casting plants report a better run of orders, but have not materially increased their productive rate.

The Pennsylvania Equipment Company, West End Trust Building, wishes to purchase a good second-hand 40 to 65-ton standard gauge geared locomotive.

The E. Keeler Company, Williamsport, Pa., has received the contract to install six 300-hp. water tube boilers in the Aspinwall Pumping Station for the city of Pittsburgh.

The Philadelphia Electric Company has awarded a contract to construct a one-story power house and substation, 54 ft. 10 in. x 84 ft. 11 in., at Schuylkill avenue and Chrisham street, to John R. Wiggins & Co.

The contract for the artillery ammunition assembly shop and scrap warehouse, to be erected for the Frankford Arsenal, in this city, has been awarded to John W. Emery, of this city.

The Main Belting Company is constructing a two-story addition to its plant at Twelfth and Carpenter streets. This will be designed particularly to take care of the increasing business in its black conveyor belt department.

The Tatersall Company, Trenton, N. J., has received bids for the construction of a concrete and steel coal pocket, 185 ft. long, from plans by Ralph White, Pennsylvania Building, this city.

Specifications for the construction work on the new Ritz-Carlton Hotel, to be erected at Broad and Walnut streets, have been sent out for estimate. Plans call for a 12-story building, 40 x 120 ft., of reinforced concrete, fireproof throughout and containing all modern improvements. Buildings on the site of the hotel are now being demolished.

The American Pulley Company reports the demand for pulleys as being well maintained and continues to operate its plant at full capacity. The export demand continues active, extensive shipments to Australia, England and Switzerland being reported. The domestic trade still buys in small lots for quick shipment, except on the Pacific coast, where deliveries in large quantities still continue to be made.

The Peerless Mfg. Company, Philadelphia, Pa., has acquired the old Ballard Knitting Mills at Washington street and McKinley avenue. The company is planning to build additions to the present buildings and equip the plant for the manufacture of fancy paper novelties and toilet paper. The plant when completed will employ between 40 and 50 hands. J. Claude Smith, Norristown, Pa., is president of the company.

## THE MACHINERY MARKETS

### Baltimore

BALTIMORE, MD., July 3, 1911.

An improvement has been shown the past month in practically every branch of the iron, steel, machinery and industrial field. In no instance reported, however, has the gain been such as to bring plant operations up to a normal basis, although material improvements are reported in some instances over the relative rate of operations in May. In iron and steel lines, particularly finished products, the volume of business is somewhat greater, due in a measure, merchants state, to the prevailing lower range of prices, as a result of which consumers have been specifying somewhat more freely. Considerable structural steel work has come out in the South, particularly in Virginia, and some pretty fair contracts in Norfolk and Richmond are under negotiation. In this immediate vicinity the building work has been confined pretty generally to small propositions, but they have made up in number what they have lacked in individual size. Machine tool merchants note a better demand, occasional small lot orders for wood and metal working machinery having been placed, although the major portion of the business is still confined to single tool propositions. The demand for the heavier types of tools has been better and there is still a pretty good volume of inquiry, but no great amount of business is expected to be transacted in the opening week of July. The demand for small tools and shop supplies shows up better; consumers are placing orders in larger quantities and the past month's business is well ahead of that for May. Contractors' tools have also been in fairly active demand. There is little new business coming from the railroads in this vicinity. The Baltimore & Ohio has placed some equipment orders, but nothing of importance in the way of machine tools has come out. Extensions to the Hagerstown or Cumberland shops of the Western Maryland Railroad are talked of, but definite information is lacking. There is little new municipal work coming out at this time in which the trade is directly interested. Considerable general work, particularly in connection with sewers and roadways, is, however, in prospect. Contracting engineers are figuring on a fair amount of heating and ventilating work, and with the volume still in sight are encouraged with the outlook for the future. Boilers and engines have been in good demand, particularly those of moderate capacity. A number of important new installations are being figured on. A slight betterment is reported in the foundry trade, although some plants are still operating quite irregularly.

George H. Smith & Co., this city, have been awarded the contract for installing an electric lighting plant for the towns of Gassaway and Sutton, W. Va. The contract includes the buildings, boilers, engines, generators and transmission lines.

Theodore W. Pietsch, architect and engineer, will prepare plans for a large addition to the plant of the Paper Mills Company, at Wicomico and Scott streets. Tentative plans call for a three-story concrete and brick structure.

Plans are being prepared for an addition to the Belvidere Hotel, work on which is expected to be started early in the coming fall. An addition to the present power plant will also be necessary.

The Board of Awards opened bids June 28 for high service pumping engines for the Mount Royal Pumping Station. The Bethlehem Steel Company is understood to have submitted the lowest bid—\$109,000, for a 54-in. and \$111,000 for a 60-in. stroke pump, with 300 working days to complete the installation. Bids will be renewed by the Water Board before awards are made.

Local contractors are estimating on a contract for the erection of a two-story steel, concrete and brick addition, from plans by Haskell & Barnes, architects, to be built at the Canton plant of the Standard Oil Company. The new building is designed for a shipping warehouse and is estimated to cost about \$75,000.

A five-story warehouse, 217-219 East Pratt street, has been purchased by the Maryland Cold Storage Company. An ice manufacturing plant is to be installed and the plant equipped particularly for the storage of fruit. The Consolidated Engineering Company has the contract for the major part of the work.

The Davidson Chemical Company has purchased a tract of about 200 acres of land, on the Patapsco River, adjoining its present plant. Additions to its plant will eventually be built, although it is stated that no definite plans have been made at this time.

The Edgemoor Iron Company, Edgemoor, Del., has the contract to supply the boilers for the power plant addition in the Baltimore Bargain House. Two

300-hp. water tube boilers will be installed.

Maurice E. Skinner, Calvert Building, and Charles R. Schmidt have been appointed receivers for the foundry business of H. C. Larabee & Co. J. C. Murphy and L. C. Larabee, copartners, filed the bill for receiver and ask also for a dissolution of the partnership. The receivers will dispose of the business.

It is reported that ground has been acquired in Highlandtown by A. Twining, on which to erect a plant for the manufacture of carpet tacks. Plans for the plant are to provide for a two-story building.

The new Era Electric & Mechanical Company has acquired a new factory building at 112 Hollingsworth street, which is to be equipped with additional machinery for the manufacture of elevators. F. M. Deemer is in charge. A portion of the equipment has been purchased.

Stowe & Stowe will prepare plans for a brick warehouse, 50 x 132 ft., to be erected at 617-619 West Pratt street, for the Baltimore Paper Box Company. The building is to have concrete floors and the usual modern warehouse facilities.

Sealed proposals will be received by the Governor of Maryland, Union Trust Building, Baltimore, until July 14, for the installation in the power house of the Springfield State Hospital, Sykesville, Md., of a power plant to include boilers, engines, generators, switchboard and piping, according to plans and specifications by Henry Adams, engineer, 855-859 Calvert Building, from whom copies can be obtained.

The Baltimore Gas Appliance & Mfg. Company is rapidly getting its plant in shape and equipment installed, although a considerable amount of miscellaneous supplies and materials still remain to be purchased. H. W. Hunter, president of the company, states that it expects to get the plant in operation, at least in part, by September 1.

The Aumen Machinery Company reports the volume of business taken in June as being considerably better than that of the previous month. A fair demand for machine shop supplies and small tools is reported.

The Dix Mfg. Company, maker of door hangers, reports a material increase in its orders in the past month. May was particularly quiet, but business taken in June more than brought the volume up to the average. Orders have been principally from the South and West.

The Chesapeake Iron Works reports business better in June than in any month since October, 1910. There has been a multiplicity of small orders, covering a very general line of plain, fabricated and ornamental iron and steel work.

The Consolidated Gas, Electric Light & Power Company has awarded a contract to J. Henry Miller, Inc., for the construction of a storage battery station in McClellans Alley, between Baltimore and Fayette streets. The building will be about 45 x 90 ft., two stories. The contract for the concrete foundations for an addition to its plant at Leadenhall and Spring Garden streets, which when completed will it is stated increase its floor space by 2,000,000 sq. ft., has been awarded to the Fidelity Construction Company.

The buildings on the site of the proposed Industrial Building, generally referred to as the Beehive Building, are being demolished preparatory to the erection of the new structure. The contract has been awarded to Henry Smith & Co. and permits for the construction work have been taken out by P. O. Kielholtz, architect and engineer. Plans call for a seven story steel frame and concrete building, providing every modern factory requirement, suitable for small manufacturing plants. About 1000 tons of structural material will be required, negotiations for which are now under way.

The Baltimore Retort & Fire Brick Company reports that while orders for early delivery have not been large a number have been entered for both special and regular clay shapes and bricks for forward delivery. Deliveries on contracts have been comparatively good during June and have exceeded those in the previous month.

Dietrich Brothers report a fair volume of miscellaneous orders for small structural and fabricated work, although inquiries have been coming out somewhat less freely. They are busy on work in hand. Specifications for the fabrication of the steel work for the Maryland Casualty Company's addition, for which this firm has the contract, are under preparation.

The Tube Bending & Polishing Machine Company, of this city, has been incorporated with a nominal capital stock under the laws of the state of Delaware, and has leased a large manufacturing building at Bayard and Carroll streets, 60 x 200 ft., together with power equipment, which will be fitted up for the manufacture



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of tube bending and tube polishing machines under patents of Louis H. Brinkman, Newark, N. J., where these machines were previously manufactured. The plant will be equipped as a general machine shop, the major portion of the equipment coming from the Newark plant. A subsidiary company, known as the Compressed Copper Company, operating under patents of Mr. Brinkman, will be located in the same building. This company will make complicated shapes in copper under a new process. Officers of the new concerns have not yet been elected. H. D. Bush, vice-president of the Baltimore Bridge Company, is prominently connected with the new enterprises.

The Baltimore Bridge Company has taken some very fair contracts for structural steel work during the month, including that for the Army and Navy Club, Washington, D. C., requiring some 675 tons, and is the low bidder on about 1000 tons, for towers, to be erected for the Government at Arlington, Va. A contract for a market building at Cartoga, Costa Rica, has been received, as has also one from the Baltimore County Water & Electric Company for steel floor work at its Avalon, Md., pumping station. The structural work for the new storage battery house for the Consolidated Gas, Power & Electric Light Company has also been booked, while pier casings will be supplied the Seaboard Air Line Railway and a number of steel cylinders for export will be furnished the United Fruit Company.

The T. C. Bashor Company's bookings in June exceeded considerably those for the previous month. Recent orders taken include two Nagle Corliss engines, 125 and 325 hp., directly connected, with Fort Wayne generators of 90 and 200 kw. capacity, for the new plant of the Coca Cola Company. Two Skinner 56-hp. engines and two General Electric 35-kw. generators are to be installed at Fort Howard for the Government.

### Cleveland

CLEVELAND, OHIO, July 3, 1911.

July starts with a better feeling in the machinery trade than for some time. There has been some improvement in nearly all lines during the past two or three weeks, the betterment being more marked in general machinery than in the demand for standard machine tools. In handling equipment orders for trolleys, hoists and locomotive cranes have become quite satisfactory in volume, although there is still little demand for heavy handling equipment for large installations. Inquiries for pneumatic tools are somewhat more plentiful. The demand for automatic machinery shows some improvement. In forging machinery some good business has been placed and the outlook is more hopeful, although inquiries directly from the railroads are scarce. The demand for drilling machinery shows some improvement.

While trade is still rather quiet with the local machine tool dealers orders show an improvement over a month ago, and some of the dealers did a fair business during the week in from single tools to lots of three or four. Lathes appear in best demand. Business is very scattered, orders coming largely from moderately sized plants that need additional equipment. Few new industrial enterprises in metal working lines have started up recently, so that there is little demand from this source. The demand for second-hand machinery is dull.

The Auglaize Power Company, which was recently organized in Toledo, Ohio, with a capital stock of \$1,000,000, is planning the erection of three hydro-electric plants for the development of the water power in the Maumee and Auglaize rivers in northwestern Ohio. It is announced that a \$500,000 plant will be built at Defiance, Ohio, as soon as plans can be prepared, having a capacity of 4000-kw., and that two other plants will be built of smaller capacity as soon as the first one is completed. Toledo and New York capitalists are back of the project. The offices will be located in Toledo. The officers are: President, J. M. Ashley; vice-president, Robert R. Livingston; secretary, W. P. Wallace; treasurer, H. L. Crawford, the latter of New York.

The Ajax Mfg. Company, Cleveland, reports an improvement in the demand for forging machinery. This company has just received an order from a western car building plant for four automatic roll feed bolt heading machines and a No. 9 bulldozer. It has just installed in the shops of the Chicago & Northwestern Railroad at Chicago one of its 6-in. universal forging machines, weighing 219,000 lb.

The Toledo Commerce Club, Toledo, Ohio, has completed plans for a new power building to be built in that

city to furnish quarters for small manufacturing concerns desiring power. The building will be located at N. Twelfth street and Woodruff avenue. It is planned to erect the building on the unit plan. The first unit to be erected at the start will cost about \$200,000 and a power plant about \$50,000. The matter is in the hands of a committee consisting of Isaac Kinsey, I. B. Hiatt, W. W. Knight, F. P. Chapin and E. H. Cady.

Bids will be received by the Board of Public Affairs, Andover, Ohio, July 14, for the erection of a complete combined pumping unit of a triplex pumping engine direct connected and driven through a friction clutch by an oil, gasoline or natural gas engine of a capacity to pump 250 gal. of water per minute against a domestic head including suction lift of 150 ft.

The Perfection Spring Company, Cleveland, now located at 2414 Superior avenue, is planning the erection of a large plant on a new site in one of the east end manufacturing districts. To provide funds for the expansion a special meeting of the stockholders will be held July 31 to vote on the question of increasing the capital stock from \$200,000 to \$500,000.

The Meech Foundry & Casting Company, Cleveland, has been incorporated with a capital stock of \$15,000 by P. D. Crane and others. The company operates the Meech foundry on Meech avenue.

The Metal Embroidery Hoop Company, recently incorporated at Canton, Ohio, will establish a plant for the manufacture of metal hoops for embroidery making. The incorporators are M. Luther Keagy, J. J. Lisbar, Fremont A. Coldren, D. L. Holwick and N. A. Sponseller.

The Foundries Company, Orrville, Ohio, has purchased the plant of the Pump & Furnace Company in that city, and will dismantle its present plant and move to the new quarters, which will prove more roomy.

Plans for a new hydro-electric plant to be built in connection with the new main power plant that is being erected by the Northern Ohio Traction & Light Company, at Cuyahoga Falls, Ohio, have been completed by the Cleveland Construction Company, 606 Citizens Building, and specifications for the equipment required have been sent to concerns interested.

The Harshaw, Fuller & Goodwin Company, Elyria, Ohio, refiner of glycerine and manufacturer of chemicals, is erecting a new factory 125 x 260 ft., of brick and steel construction. It is stated that the motor drive will be substituted for steam drive in the remainder of the company's plant. The Forest City Steel & Iron Company, Cleveland, has the contract for the structural steel for the new building.

The Director of Public Safety, Cleveland, will receive bids July 14 for a steam heating apparatus for a fire engine house at West 101st street and Loraine avenue.

The Canton Fertilizer Company, Canton, Ohio, will build a large brick fertilizer plant to replace one that was recently destroyed by fire.

The E. A. Miller Rotary Engine Company, Pittsburgh, Pa., is negotiating with the Board of Trade of Alliance, Ohio, for the use of the asbestos plant in that city as a site for a plant for the engine company.

Fire in the plant of the Ohio Iron & Brass Bed Company, Eaton, Ohio, June 22, caused a loss of about \$15,000. The machine shop, foundry, boiler and engine rooms were destroyed.

It is announced that the Knight Tire & Rubber Company, Canton, Ohio, will shortly begin the erection of a new rubber plant.

### Cincinnati

CINCINNATI, OHIO, July 3, 1911.

A slow but steady improvement is noticed by machine local tool builders. The inquiry is encouraging, especially that from the East. A seasonable dullness is reported on Southern business and the Pacific coast is not furnishing its usual number of orders. The export trade is good and local manufacturers are paying more attention to this particular field than ever before.

There is a moderate demand for second-hand machinery, running mostly to the smaller tools. Electrical equipment is moving in a very satisfactory manner. This applies principally to the smaller units of generators and motors. As there has been a reduction made recently in the price of electric current, locally, the call for small motors will no doubt increase very much.

The Allis-Chalmers Company announces that beginning with July 1 it will revive the engineering, purchasing and sales departments of the Bullock Electric Mfg. Company, a subsidiary plant at Norwood, Ohio, a Cin-

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cincinnati suburb. Heretofore all correspondence was carried on through the Milwaukee office, but the change means that the local plant will be operated more on a unit basis. E. T. Pardee, of Milwaukee, has been appointed general manager of the Bullock Works, in full charge of the engineering, manufacturing and sales departments, and E. R. Knight retains his present position as superintendent. About 40 employees will be transferred from the general offices at Milwaukee to the Norwood plant.

The recent campaign of the Cincinnati Commercial Association has raised the membership of that organization to nearly 1400. This association succeeded the old Cincinnati Industrial Bureau and its members are very much interested in securing new manufacturing plants. As a number of machine tool builders are moving to Oakley suburb there will soon be several desirable vacant factory buildings in the Camp Washington district that would be available for new concerns.

The Amor Steel Foundry Company, who purchased the old Steel Foundry Company's plant at Winton place, Cincinnati, announces that it will begin operations about August 1. Over 200 men will be employed and for the present the company will confine itself to making steel castings of all kinds.

A fire at Ironton, Ohio, June 29 destroyed the plants of the Ward Lumber Company, the Ironton Tool Handle Works and the Allen & Lester Planing Mill Company. No rebuilding plans have yet been announced.

The Triumph Electric Company, Oakley, Cincinnati, Ohio, reports June as being one of the best months in the history of the company. Among recent orders are 36 generators of different capacities for the Wesco Supply Company, St. Louis; three for the Ohio Mechanics Institute, Cincinnati; 18 motors for the R. K. LeBlond Machine Tool Company and 11 for the I. & E. Greenwald Company, Cincinnati. In addition to its domestic business the Triumph Company is shipping a large number of generators and motors to foreign countries.

It is rumored that the Dayton Gas Company, Dayton, Ohio, is having plans made for a large plant in the Edgemont district.

The Union Central Life Insurance Company, Cincinnati, has acquired the old Chamber of Commerce Building and will erect on this site an office building of about 20 stories. The architect has not yet been selected.

The Vincennes Tractor Company, Vincennes, Ind., is inquiring in this market for a second-hand 30-in. lathe, a milling machine, cutoff saw, drill press and other machine tools.

The C. A. Nelson Drain Tile Company has been incorporated at Beaver Dam, Ohio, with \$10,000 capital stock, to manufacture drain tile and brick. C. A. Nelson is the principal incorporator.

Tietig & Lee, architects in the Lyric Building, Cincinnati, are drawing up plans for the new cooperage factory of the Sauferle Cooperage Company, to be erected at Winton place. The new plant will be of brick construction and its estimated cost is placed at \$20,000.

The Baltimore & Ohio Southwestern Railroad Company has taken out a permit to erect a boiler room at Spring Grove and Arlington avenues, to cost about \$4,000.

The Henson Mfg. Company, Springfield, Ohio, is a new incorporation, with \$10,000 capital stock, to manufacture a patented railroad lantern. O. R. Henson is named as the principal incorporator.

There is an unconfirmed report that the Wise, Shaw & Feder Company, Cincinnati, will soon make some large additions to its shoe factory. The company's capital stock was recently increased from \$120,000 to \$190,000.

The Incandescent Light & Stove Company is moving from its old quarters on Pearl street, Cincinnati, to its new concrete factory in the Oakley district.

The L. Schreiber Sons Company, Cincinnati, has acquired additional space adjoining its architectural iron plant and some extensions may be made at an early date. The general offices and drafting department of the company are to be moved to its Norwood factory about August 1.

The new plant of the Cincinnati Lathe & Tool Company, in the Oakley district, will be of brick construction, 80 x 150 ft., one story, with saw tooth roof. The M. Marcus Building Company, Cincinnati, the contractor, has already commenced work laying the foundations.

### Chicago

CHICAGO, ILL., July 3, 1911.

The item of principal interest in the machinery market during the past week, in the matter of size at least, was the placing by the Atchison, Topeka & Santa Fe Railroad of its orders for about \$25,000 of tools. Four-fifths of this business was taken by Manning, Maxwell & Moore. About half of the tools bought consisted of lathes ranging in size from 18 to 36 in. While not quite so active as in the preceding week trade is reported as showing a satisfactory improvement. The volume of miscellaneous orders ranging in value from \$200 to \$2,000 was well maintained. The addition to the International Harvester Company's Tractor Works machine shop will, it is expected, bring into the market very soon inquiries for a number of machines. An interesting order for second hand tools for export to Great Britain was placed with a local dealer. Some departures from what are considered regular prices are reported as current here. Such concessions, it is believed, are made wholly upon the dealer's own responsibility.

A. E. Montgomery, Moline, Ill., formerly secretary and treasurer of the Moline Elevator Company, which is now owned by the Otis Elevator Company, has leased the building erected by the Moline Tool Company and will again engage in the elevator business. A company is about to be incorporated with a capital stock of \$100,000 and new equipment will be purchased.

Patterson & Davidson, Chicago, are engineers and architects for a new factory building to cost \$300,000. All of the equipment for the building has been purchased except one 300-kw., 220-volt, 3-phase, 60-cycle generator.

The fire which damaged the plant of the Star Brass Works Company, Kansas City, Mo., was not severe and the company is not in the market for new equipment.

The Kultgen Nichol Foundry Company, Chicago, has been incorporated with a capital stock of \$10,000 to do a general foundry and machine shop business. The incorporators are John D. Kultgen, John G. Nichol and Nels J. Johnson.

The Crippen Improved Thresher Company, Arlington, Kan., has developed appliances for the more economical threshing of grain, both as to power consumption and perfect separation. It is about to build and equip a factory for the manufacture of these devices at a cost of \$50,000.

The Federal Rubber Company, Milwaukee, Wis., recently reorganized with a capital stock of \$1,000,000, is now manufacturing solid rubber tires, horseshoe pads and mechanical rubber goods. It expects to equip at once for the manufacture of pneumatic tires both for bicycles and automobiles. This will require a considerable tonnage of forms and molds and other foundry made equipment.

The Keystone Glue Company, South Milwaukee, Wis., is rapidly completing its plant, consisting of six buildings, among which are a boiler house and engine room 50 x 100 ft. and a one-story machine shop 22 x 96 ft.

### The South

LOUISVILLE, KY., July 3, 1911.

The chief factor in business just now is uniformly stated to be the crop situation. The wheat crop in this section has been harvested, and was of average yield, but the oats and hay crops will be short. Cotton is threatened in some sections by drouth, although heavy rains have broken the dry period to a large extent. The feeling is that in the South the farmers will be able to market better than average crops at good prices, and that this will furnish a foundation for good business. Machinery trade continues about normal, with a good volume of inquiries and an average amount of business being placed. Some improvement as compared with a few weeks ago is in evidence.

A permit for the erection of a power house has been taken out by the Saints Mary & Elizabeth's Hospital. A good deal of new power machinery is to be installed. J. J. Gaffney is the architect. Two electric elevators for an addition to the building will also be required.

The millwright shop of the J. Lott Machine Company, Louisville, was damaged by fire June 29. Some wood-working machinery will be required to replace that which was damaged. The power equipment was not injured.

Electric motors will be required by Harcourt & Co., engravers, of Louisville, who are planning the remodel-



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ing of another building and moving into it August 1. Additions to the equipment in the line of special machinery will also be needed.

Hite D. Bowman, an automobile dealer of Louisville, is erecting a two-story addition to his garage, and will add a lot of machine tools to the equipment of his repair shop, which will be greatly enlarged.

The Westinghouse Machine Company is installing a rotary converter in the power house of the Louisville Railway Company. The latter is marketing \$750,000 of bonds for the purchase of new rolling stock and making other improvements, and it is understood that the power house will be given a greater capacity, although officials of the company state that no enlargements will be made immediately.

The old post-office building in Louisville will be remodeled for use by the Louisville Courier-Journal. Elevators will be installed, and a good deal of equipment will be required, although most of this will be brought from the present building. John Bacon Hutchings is the architect.

An iron bridge is to be erected over Elkhorn creek, near Frankfort, Ky., the Fiscal Court of the county dividing the cost with citizens. The expenditure involved will be about \$3,000.

The city of Sturgis, Ky., is planning to establish a water works plant. A public meeting is to be held shortly for the purpose of getting the matter into definite shape.

M. C. McNamara, Augusta, Ky., has purchased a building at Melbourne, and will remove his shoe factory to that point. Some enlargements of the plant are in contemplation.

Coal operations in the Eastern Kentucky field have been considerably strengthened by recent mergers. The Log Mountain Coal & Coke Company, which has \$3,000,000 capital stock, is the name of a concern through which six mines will be operated. It is believed that by joining forces in this way necessary improvements can be much more readily financed than under other conditions.

The Model Machine Tool Company, which is being organized by Cincinnati interests for the manufacture of an improved turret lathe, is considering the establishment of its plant at Maysville, Ky. G. C. Atkinson, Cincinnati, is one of those interested, and he has had the matter of locating at Maysville under consideration. The Maysville Foundry & Machine Company, it is stated, has proposed turning over its plant to the new concern.

The Bowling Green Quarries Company, Bowling Green, Ky., is installing some new equipment. A diamond saw was placed last week. James Pickels is manager of the plant.

The Nicola Building Company, Pittsburgh, Pa., has the contract for the erection of the industrial town of Jenkins, Ky., which is being built by the Consolidation Coal Company, Baltimore. More than 1000 buildings will be put up. The Nicola Company is erecting and equipping sawmills, planing mills, blacksmith shops, etc., for the work, and will be in the market for equipment. The Consolidation company is contemplating the construction of water works and an electric light plant.

The New Bluegrass Canning Company, Owensboro, Ky., will rebuild its plant, which was destroyed by fire June 29. J. Ed. Guenther is general manager of the company.

The Barbour Air Grate & Mfg. Company has been incorporated at Owensboro, Ky., with \$25,000 capital stock. The incorporators include T. M. Barbee, R. B. Thompson, M. Gano Buckman and others.

The Rose Run Iron Company, Olympia, Ky., is planning to develop its lumber interests in Bath County and is planning the erection of a sawmill and the construction of a railroad into the property. Clyde Young is general manager of the lumber department of the company.

The officers of the Gray & Dudley Hardware Company, Nashville, Tenn., which operates a foundry as well as conducts a wholesale hardware business, were re-elected at the annual meeting. R. M. Dudley is president and W. A. Griswold is superintendent of foundries.

The Virginia Iron, Coal & Coke Company has given out a statement to commercial interests at Bristol, Tenn., where it has a furnace and rolling mill which have been idle for over two years, stating that there is no immediate prospect of a resumption of business.

The Commercial Club of McMinnville, Tenn., has under consideration a proposition from Ohio interests for the establishment of a malleable iron foundry at that

point. Local people are asked to subscribe to 7 per cent. of the capital stock of the new enterprise.

Bruce Baxter and associates have taken over the business of the King-Baxter Lumber Company, and plan to make improvements in the plant and to enlarge the scope of the business. The plant is located at Orange Grove, near Chattanooga, Tenn.

The furniture factory, planing mill and boiler room of the Loomis & Hart Mfg. Company, Chattanooga, Tenn., were destroyed by fire last week. Arrangements to rebuild are now under way. A large part of the machinery was destroyed and will have to be replaced.

Many plants in Bristol, Tenn., which have heretofore been operated by steam power have contracted with the Bristol Gas & Electric Company for electric power, which will be supplied as soon as the Watauga Power Company completes the construction of its hydroelectric plant on the Watauga river.

The Universal Account Register Company has announced plans for the removal of its plant from Knoxville, Tenn., to Bristol, Tenn. The Board of Trade of Bristol secured the change.

The Board of Trade of Knoxville, Tenn., is endeavoring to secure the location in that city of a branch of the Aluminum Company of America. It is stated that aluminum ore is to be found freely in Eastern Tennessee.

Bridge material is to be purchased immediately by the Fidelity Securities Company, Nashville, Tenn., H. H. Mayberry, president, for use in the construction of an interurban line.

The Memphis, Tenn., Compress Company is planning the erection of a new building for the purpose of doubling the capacity of its cotton compress. It is reported that an expenditure of \$500,000 is contemplated.

The Knoxville Machine Tool Company has filed articles of incorporation at Knoxville, Tenn. The capital stock of the company is \$25,000 and the incorporators are John P. Staub, John W. Cruze and Solon S. Kipp.

The Gadsden Concrete Company, Gadsden, Ala., is in the market for power equipment, including steam boilers and engines, as well as concrete working machinery.

The Gulf City Boiler Works, Mobile, Ala., has purchased the power plant of the White Line Railway and will equip it for the manufacture of boilers. Additional machinery which it is estimated will cost \$15,000, is to be purchased. W. M. Evans is president of the company.

The Gulf Coast Automobile & Gas Engine Company has been incorporated at Moss Point, Miss., with \$10,000 capital stock. Those interested include J. G. B. Rouse, M. A. Victor and others.

The repair shops of the Ft. Smith Light & Traction Company, at Ft. Smith, Ark., are to be considerably enlarged. J. W. Gillette, general manager of the company, has stated that this is the beginning of improvement work which will involve an expenditure of \$200,000.

An issue of bonds to the amount of \$75,000 may be made by the city of Dothan, Ala. An electric light plant and a water works system will be constructed if the issue is approved.

Plans have been drawn for an electric light plant and water works station which will be built at Hartsell, Ala., by the municipality, an issue of \$28,000 of bonds for this purpose having been approved. Xavier A. Kramer, of Magnolia, Miss., is the engineer in charge.

Operations have been begun at Birmingham, Ala., by the International Harrow Cultivator Company, which recently completed a plant at a cost of \$50,000. G. A. Neal is president and R. D. Johnson secretary of the company.

A plant for the manufacture of hay presses is being established at Oakvale, Miss., by J. I. Fortubury.

A hydroelectric plant is to be built near Alexander City, Ala., by the Industries Light & Power Company, which was recently organized for that purpose.

### Western Canada

WINNIPEG, MAN., July 1, 1911.

The movement of trade has begun in earnest in Western Canada. There was some caution during the last two months, because mistakes were made last year through impulsiveness in venturing on the early promise of the crop, a promise that turned out to be largely disappointing. Building operations have this year been held back because of last year's experience. Now, however, the spirit of enterprise and confidence seems to have taken possession of the country, and business is in full tide. Everybody is predicting a 200,000,000-

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bushel wheat crop in the country between the Great Lakes and the Rocky Mountains. Besides wheat there will be a large yield of other cereals. In the West the question of freight rates is being discussed at the present time. The carrying charges on iron and steel goods are shown to be much higher on Canadian railroads than on roads across the line. This is one of the grievances the Western Grain Growers' Association, a very aggressive organization, is now complaining about.

In all parts of Canada railway building is very active, but in the province of Saskatchewan it is more active than elsewhere. More than 1000 miles of new line will be constructed in that province this year. Last year it laid 475 miles, which was more than any other province laid. In Saskatchewan the Canadian Northern Railway is constructing 330 miles; the Grand Trunk Pacific, 340 miles, and the Canadian Pacific Railway, 348 miles. At the end of the year the province will have 4752 miles of line. In the province of Alberta the Canadian Northern will grade 150 miles of its main line west of Edmonton, will push its branch toward the Peace River country and will complete its Edmonton to Calgary line. In British Columbia it expects to complete 100 miles of line from Port Mann, its Pacific terminus, toward the interior.

The Winnipeg Tribune estimates at 345,000 tons the quantity of steel rails that have been ordered for Canadian roads this year.

The Canadian Northern Railway Company is spending between \$2,500,000 and \$3,000,000 upon the construction of two steel bridges in the Rainy Lake district near Fort Frances, Ont. Johnson & Carey, Minneapolis, have the contract for the difficult part of the reconstruction, of which these bridges are a part.

The Carter, Halls, Aldinger Company, Winnipeg, has obtained the contract to erect the Grand Trunk Pacific roundhouse at Regina, Sask., the cost to be \$75,000.

The town of Macleod, Alberta, is bidding for the Canadian Pacific Railway Company's big western car shops, and so is Red Deer, in the same province. In the meantime Calgary and Medicine Hat, the greater rivals for the industry, are leaving nothing undone to capture it.

A very large number of grain elevators are being built and equipped in the Canadian West this year. The Saskatchewan Co-operative Elevator, Regina, Sask., will alone build 25.

The Saskatoon Drinkle Corporation has been incorporated at Ottawa with a capital stock of \$2,000,000. Its head office is to be in Saskatoon, Sask.

The Hudson's Bay Company is about to build a \$1,000,000 department store at Calgary, Alberta. It will be of structural steel framework, designed to carry six stories, of which but four are to be built at the outset.

The City Engineer of Winnipeg has laid before the Fire, Light and Water Committee a plan to extend the present high-pressure water service five miles.

The North British Rubber Company, Edinburgh, Scotland, is expected to establish a branch office and distributing warehouse at Calgary, Alberta.

The Sterling Refining Company, Cleveland, Ohio, is about to erect a large warehouse in Winnipeg.

A steel barge for the Great Lakes Dredging Company was launched from the yards of the Western Canada Dry Dock & Shipbuilding Company, Port Arthur, Ont., on Tuesday. This is the first output of the yards. The barge is 173 ft. long by 36 ft. wide, and 13 ft. deep.

between seasons dullness is making itself felt somewhat.

Word comes from Grand Rapids, Mich., that a number of the furniture factories in that city are taking advantage of the shutdown caused by the furniture workers' strike to install new equipment and make extensive repairs.

Building conditions are chiefly notable for inactivity, no large contracts having been awarded the past week.

The Universal Accessories Company was incorporated this week to manufacture pump regulators and other special pump accessories. The company has a capital stock of \$25,000, with R. W. Baker, Victor Olson and Charles E. Bryant as the principal stockholders.

The Russel Wheel & Foundry Company, one of the city's largest producers of cars and structural steel work, has decided to increase its capital stock from \$500,000 to \$750,000 for purposes of expansion.

The Cross Gear & Engine Company has filed articles increasing its capital stock from \$20,000 to \$80,000. The business of the company has increased to the extent that it has become necessary to install new machinery and it is expected that large additions to the plant will be made in the near future.

The Frontier Engineering Company and the State Brass Works have consolidated and the plant of the latter company will be dismantled and removed to the Frontier plant, thereby increasing the facilities and capacity of the combination.

The Roberts Tube Works is a new copper and brass rolling concern just organized with \$15,000 capital stock. The principal stockholders of the company are William H. and John K. Roberts.

The National Heater Company, manufacturer of a heater of special design, has been incorporated with a capital stock of \$125,000. Alexander W. Finlayson and Ernest G. Joy are the men behind the new enterprise.

The Ideal Commercial Car Company, maker of light delivery cars, has found it necessary to increase its capital stock from \$10,000 to \$200,000 to take care of increasing business.

Detroit's newest accessory company is the Detroit Auto Top Fastener Company, which has just been organized with a capital stock of \$50,000.

The Hecla Portland Cement Company has filed notice of dissolution. The company has a capital stock of \$1,000,000 and owns a large plant at Bay City and considerable valuable equipment.

The Tatham Gold Mesh Company has been organized this week with a capital stock of \$10,000 to manufacture dental supplies.

A new company has been incorporated under the style of the Simplex Machinery Company. George W. Dunphy, B. W. Doyle and Adam D. Boyd are the principal stockholders.

The plant of the Grant Brothers Foundry Company was completely destroyed by fire last week, entailing a loss of \$12,000. It is stated that the company is contemplating continuing operations as soon as suitable quarters can be secured.

The Charles P. Limbert Furniture Company, Holland, Mich., is having plans prepared for extensive additions to its plant. The new structure will be of brick, four stories, and of L shape, one wing being 74 x 132 ft. and the other 64 x 200 ft.

The Apex Horseshoe Company, Albion, Mich., has filed articles of incorporation with \$30,000 capital stock. The company will manufacture horseshoes and related articles.

The City Council of Mt. Clemens, Mich., has appointed a committee to obtain estimates on the cost of a large electric motor pump for the municipal water works plant.

The Gale Mfg. Company, Albion, Mich., a large manufacturer of agricultural machinery, has filed notice of increase of capital stock from \$800,000 to \$2,000,000.

The firm of John S. Weidman & Co., Mt. Pleasant, Mich., are making preparations to erect a sawmill at Trout Lake, near their lumber holdings. A logging road will be built to reach the timber.

The Carter Dump Wagon Company has been organized at Holly, Mich., with a capital stock of \$50,000. The company will engage in the manufacture of dump wagons and road-making machinery.

Fire caused a loss approximating \$25,000 at the Commonwealth Power Company's power house at Trowbridge, Mich. The building and equipment, which included a 6000-hp. generator, transformers, regulators, governors and other electrical machinery of the most expensive types and a battery of hydro-turbine engines, were completely destroyed. Officials of the company

### Detroit

DETROIT, MICH., July 3, 1911.

Perhaps the most important feature of the week is the news that contrary to the usual custom many of the large automobile plants will not close at all this year, the amount of 1911 orders being so great as to keep them running at nearly full capacity through the Summer, and they are already figuring on getting next year's business under way. This is all the more significant when it is considered that many of the factories have increased their capacity during the past year and augurs well for future expansion. Naturally the accessory manufacturers and the trade generally will be benefited by this turn of affairs. Machinery dealers report conditions to be quite satisfactory, there being a goodly number of inquiries. There is also a fair demand for most lines of small tools, although the usual



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state that new equipment will be ordered and the work of reconstruction commenced at once.

The Detroit Milling Company, Adrian, Mich., has awarded the contract for the construction of two new elevators to the Burrell Engineering Construction Company. Electrical machinery of the latest design will be installed. It is also stated that a new flouring mill will be erected in the near future.

The Duplex Printing Press Company, Battle Creek, Mich., is contemplating improvements which will double the capacity of its present plant and involve the expenditure of \$500,000,000. A new foundry, new machine shop and erecting department, with complete new equipment, are planned.

The Cadillac Chair Company, Cadillac, Mich., has been organized with a capital stock of \$100,000. A factory site has already been purchased and work on the buildings is to commence at once. D. B. Kelly and J. N. Perkins are president and secretary, respectively, of the new company.

The Bear River Paper & Bag Company, Petoskey, Mich., has filed a voluntary petition in bankruptcy and Leon Chichester and A. B. Mudgett have been appointed receivers. This plan was deemed advisable in order to effect a reorganization of the company and to secure more capital.

The L. G. Smith Egg Case factory, Smithville, Mich., is to double its capacity. The factory's motor power plant will be wholly rebuilt and modern equipment installed throughout the plant.

The Uncle Sam Macaroni Company, Tecumseh, Mich., has plans in the hands of the architects for the erection of a modern plant 68 x 431 ft. and of brick construction. A large amount of equipment, including a modern vacuum cleaning system, will be installed.

The George W. Manning Broom Mfg. Company, Grand Rapids, Mich., was organized this week with a capital stock of \$30,000. George W. Manning, Curtis T. Wolford and G. W. Quick are the principal stockholders.

The Frankemuth Milling Company, Frankemuth, Mich., has filed articles of incorporation with the Secretary of State. The company has a capital stock of \$32,000 and will do a flouring and grist mill business.

The J. W. Wells Lumber Company, Menominee, Mich., has filed notice of an increase of capital stock from \$100,000 to \$650,000.

The Monroe Mfg. Company, Pontiac, Mich., is completing two additional buildings in that city. One of the buildings will be used for sheet metal stamping and will be equipped with new machinery.

The Michigan Steel Casting Company, Detroit, is building two buildings which will double the capacity of its plant. The buildings are practically completed.

The Carter Car Company, Pontiac, Mich., is about to commence work on the erection of a model machine shop 70 x 144 ft., of one story, brick construction. The architectural work is in charge of W. E. Wood, Ford Building, Detroit.

### Indianapolis

INDIANAPOLIS, IND., July 3, 1911.

E. D. Johnston, formerly president of a hydraulic company here, is planning to establish two electric power plants on the Whitewater Canal, one to occupy the old water works site and the other at a mill in the southern part of the city. There will be a 400-hp. reserve plant between the two.

The factory of the Central Stove & Foundry Company, Anderson, Ind., has been sold by the receiver to Chauncey B. Fisher, of Anderson, for \$5,000.

The Bedford Harrow-Drum Company, Bedford, Ind., has been incorporated with \$10,000 capital stock to manufacture machinery. The directors are Arthur J. McDonald, E. E. Mitchell and T. C. Underwood.

The Novelty Tool Company, North Vernon, Ind., has been incorporated with \$10,000 capital stock, to manufacture tools. The directors are H. H. Dowd, F. X. Gettwallis, Harry Hicks, W. J. Hare and J. W. Linkhart.

The Terre Haute Iron & Steel Company, Terre Haute, Ind., has filed notice for dissolution with the Secretary of State.

The Standard Mfg. Company, Cambridge City, Ind., has redeemed its preferred stock and decreased its capital stock from \$30,000 to \$20,000.

The Vincennes, Washington & Eastern Traction Company, Vincennes, Ind., has increased its capital stock from \$100,000 to \$600,000.

The Superior Court at Michigan City, Ind., has ordered the closing up of the affairs of the Western Launch & Engine Works of that city, as it was found by the receiver that the plant could not be continued in operation without borrowing money. Martin T. Krueger has been receiver, but will be succeeded by another to be selected by the stockholders to wind up the company's affairs. The company has liabilities of \$50,000.

James A. Sweeney, Plymouth, Ind., representing the National Cement Post Company, Cleveland, O., is organizing a company at Tell City, Ind., to establish a cement post factory there.

The Frolicker-Helmers Shoe Company, Maysville, Ky., has purchased the old spoke factory building at Lawrenceburg, Ind., for \$10,000, and will convert it into a shoe factory.

The organizers of the Interstate Mill Supply Company, Ft. Wayne, Ind., have purchased a controlling interest in the Ft. Wayne Oil & Supply Company, instead of establishing the new concern. The officers are, under the reorganization: President, Edward Baltes; vice-president, Mark T. Cocherl; secretary and manager, E. W. Puckett; treasurer, W. A. Hobson.

The Indiana & Michigan Electric Company, South Bend, Ind., will construct a dam and power house at Elkhart, Ind., to develop 3,000 hp. William G. Fargo, Jackson, Mich., is the hydraulic engineer in charge.

### St. Louis

ST. LOUIS, MO., July 1, 1911.

A number of good orders were placed during the week, especially by electrical and allied interests. These ran mainly to automatic screw machines, light drill presses and grinder equipment. The general run of business is not yet up to normal. The inquiries that are being received give ground for hope of better things shortly, the impression gaining that replacement on depreciation account will soon begin to have a bearing, to say nothing of the new needs incident to the opening out of the fall business. Machinery and crops are not exactly synonymous, but the reports of crop prospects from the St. Louis trade territory have had the effect of improving the tone of things in some respects. Included among the developments of the week was the presence in the market of a number of Texas and Oklahoma buyers, who placed orders and gave assurance that others were likely to follow.

The Wagner Electric Company, St. Louis, has completed arrangements to increase its capital stock from \$1,200,000 to \$1,500,000. The \$300,000 of new funds will largely be expended in the establishment of a branch plant at Montreal, Canada, where manufacturing will be done for distribution on the other side of the tariff wall, as well as to comply with the patent requirements of manufacture in that country. Alfred Collyer, Montreal, will be the Canadian manager of sales. A subsidiary company will fill the technical legal requirements. The St. Louis plant is also to be enlarged.

The Imperial Clock Company, St. Louis, has been incorporated with \$100,000 capital stock for the manufacture of clocks, etc. The incorporators are P. H. Huck, G. Carlander and R. E. Hayes.

The Big Brownie Mining Company, Joplin, Mo., has been incorporated with \$40,000 capital stock by Fred. W. Kelsey, Charles W. Edwards and O. E. Marshall and will install machinery at its shaft at once.

The St. Louis Cash Register Company, to manufacture cash registers, has been incorporated in St. Louis with \$500,000 capital stock by A. H. Fischer, R. M. Quackenboss and Leo Rassieur.

The Byrnes Belting Company, St. Louis, has bought a new site 60 x 155 ft. for a plant and will build and equip a three-story and basement structure which will more than double its present capacity.

Charles Baer, St. Louis, has organized a new laundry company with \$100,000 capital stock which will equip a complete plant at once.

The St. Louis Shipping Case Company, St. Louis, has been incorporated with \$50,000 capital stock by O. K. Berg, C. K. Berg and Emil Granberg to manufacture shipping cases. Equipment for a good sized plant will be bought.

The Huttig Sash & Door Company, recently burned out with a loss of more than three quarters of a million dollars, has bought the plant of the William G. Frye Mfg. Company, whose yards were burned but whose factory was saved. The Frye plant will be used to supply demand during the rebuilding of the Huttig

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plant, and both will be operated in conjunction after that time. The Huttig plant was the second largest in the country and the Frye plant stood next to it in size.

Charles W. Martin & Co., with \$50,000 capital stock, have leased quarters and will install equipment for the manufacture of fish net.

The Universal Dispenser Mfg. Company, St. Louis, has been incorporated with \$20,000 capital stock by William H. Becker, Charles W. Stifel and William H. Taylor, and will install equipment for the manufacture of fountain dispensing machinery.

The Rolla Fire Clay Company, Rolla, Mo., has been incorporated with \$14,000 capital stock by David E. Cowan, W. T. Dennison and J. A. Watson, and will install equipment for the manufacture of brick and other clay products.

The Standard Machine Mfg. Company, Carthage, Mo., with \$30,000 capital stock; Charles B. Guinn, W. H. Phelps and J. P. Leggett are the incorporators. The company will establish a manufacturing plant at once.

The East Prairie Milling Company, East Prairie, Mo., has increased its capital stock from \$25,000 to \$40,000 for the purpose of extending its milling equipment.

The United States Government has just completed the installation of a new heavy size Cleveland open side planer at its shops at the Arsenal here.

The Fulton Iron Works has broken ground for its large new plant on a seven-acre tract west of the city, plans for which were announced recently.

The Curtis & Co. Mfg. Company reports a very good business in its manganese steel casting department, especially in its specialty of manganese steel crossings for street railways.

A number of the metal working industries of St. Louis are reported to contemplate the early enlargement of their plants either on their present sites or on entirely new sites, the plans calling for considerable new equipment when definitely decided upon.

The Mechanics & Kremer-Moon Heating Company, St. Louis, has been awarded the contract for installing the heating systems in 26 officers' quarters, the administration building, the commissary store house and a bowling alley at Fort Douglas, Utah, on a bid of \$23,635.

W. F. Duncker, a machinery manufacturer of Hamburg, Germany, inspected a number of St. Louis manufacturing of tools, gears, etc., the past week, his trip being for the purpose of studying American methods.

### Eastern Canada

TORONTO, ONT., July 1, 1911.

The nearer prospects of the next Canadian harvest are brighter even than were the more distant ones. June, which has always been a critical month for the crops in the prairie country, has this year been auspicious. The weather was not too hot, there was a sufficiency but not an excess of moisture, and no destructive hailstorms swept over the fields. In less than six weeks harvest operations will begin in Alberta, Saskatchewan and Manitoba. It is estimated that 50,000 harvest hands will have to be assembled in the prairie country from other sources. The mobilization of this labor army would not be a difficult matter for the railways, but the recruiting of the force undoubtedly will. Whence are the men to be drawn? All the effective rough labor of the country is already fully absorbed in railway building and other fixing of capital in construction. All the pores of the country's manufacturing industries are open for the absorption of skilled labor. As the harvest outlook becomes the more assured the labor demand on railway and other construction account and on account of the manufacturing industries becomes harder to slake, and the detaching of hands from these employments in order to muster a host of harvesters becomes less and less possible. It has been proposed that harvest excursions, heretofore run from Eastern Canada to the West, be run from the British Isles for this season. The Canadian Pacific Railway, having both ocean and overland lines, could give special rates and make special arrangements for return trips, if the Canadian government would co-operate. The men selected would be capital immigrants, and their introduction to the country as harvest hands would win many of them as permanent settlers.

The railway equipment shops are exceedingly busy on locomotives and rolling stock that are due for delivery on the eve of harvest operations. There continues

to be a lively demand for every variety of apparatus used by farmers. A development that appears to be now incipient is the opening of a large demand for electrical outfit for farmers. The Ontario Hydro-Electrical Commission is just now having inquiries and investigations made in Europe concerning the applications of power to farmers' economy. This is in pursuance of an act passed by the last session of the Legislature authorizing the running of branches from the commission's trunk transmission line into individual farms. The coming autumn is certain to bring a very great demand for every kind of equipment. Not only will there be the proceeds of a large crop to spend, but there will be the further inflow of capital from abroad, attracted by the great harvest reports and the growth of the country. This is Dominion Day, and it marks a higher point of progress in wealth production and general development than the country ever attained to before.

The North American Smelting Company expects to begin the erection of its smelter at Kingston, Ont., this month. Its lead ore will be drawn from its property at Loughboro, Ont.

The ratepayers of Belleville, Ont., have voted in favor of granting to the Marsh & Henthorn Company, foundrymen and machinery manufacturers, a free site, a \$25,000 bond guarantee and a fixed assessment for 20 years. The ratepayers also approved the granting of municipal aid to the Allard Company, which is to establish in the city works for the reduction of ores containing gold, platinum and other metals.

The Aluminum & Crown Stopper Company, Toronto, has taken out a permit for the erection of a four-story brick warehouse, to cost \$100,000.

The Oxford Knitting Company, Woodstock, Ont., is about to extend its works by the addition of a building 200 ft. long and 60 ft. wide. This will afford room for the employment of 150 hands more.

The Cockshutt Plow Company, Brantford, Ont., announces that it will make five large additions to its present plan and employ 500 hands more than it now employs, making the total number 1300.

The Telegraph, of Welland, Ont., says that it has information that the prospects of reciprocity between Canada and the United States are causing many people to hesitate in making further commitments in the town. Some factories that were in a fair way of being brought to the town are now kept from coming by doubt as to the adoption of the Knox-Fielding pact.

The International Electric Supply Company, an offshoot of the United States concern, but backed by local capital, has applied to the Light & Heat Commissioners of Guelph, Ont., for a lease of the Marlock Building, which belongs to the municipality, the purpose of the company being to use it for the manufacture of electric irons and other electric appliances.

The site for the Standard Cable Company's building in Hamilton, Ont., has been closed and building operations are to be begun at once. A plant is to be erected and equipped at a cost of \$500,000.

The Chief Engineer of the Dominion Public Works Department, Ottawa, has approved the plans of the Pilson Iron Works, Toronto, for a dry dock in connection with the company's plant. The plans provide for a steel dock with a marine slip and water-tight bulkheads, and the chief engineer recommends that the 3½ per cent. government subsidy for this be upon an invested capital of \$850,000. The company's estimate of the expenditure was \$894,000. The steel dock itself would cost \$256,000; the shops and machinery, \$259,862; the dock machinery, \$36,750; and the rest of the expenditure would go to wharfage and real estate.

The ratepayers of Woodbridge, Ont., have voted in favor of the by-law authorizing the expenditure of \$40,000 upon the construction of a steel bridge over the Humber River.

The Dominion Turpentine Company, an organization of American and Canadian capitalists, proposes to establish a very large factory at Sudbury, Ont. The capital stock is to be \$250,000, and will be provided by the parties who are now at the back of the undertaking. The Sudbury Board of Trade has been in negotiation with the parties.

The Grand Trunk Pacific Railway Company's transcontinental depot, which is to be erected on the Champlain market place in Quebec City, is to cost \$750,000, and is to be completed at the end of next year.

Work is shortly to be started on a new steel-arch bridge to replace the present cantilever bridge crossing the Niagara River from Niagara Falls, Ont., to what



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was the village of Suspension Bridge, and is now a part of the city of Niagara Falls, N. Y. The bridge will be built by the Michigan Central Railway Company.

The Montreal Water & Power Company has renewed for six months the option it gave the city of Montreal for the purchase by the latter of the company's interests for \$1,020,000.

### Texas

AUSTIN, TEXAS, July 1, 1911.

Industrial conditions throughout the State and the Southwest generally are unusually good for the mid-summer season. The prospects for a very large cotton crop continues to keep up the demand for ginning and compress machinery. There are also a number of new cotton seed oil mills in process of construction and under consideration. Water storage reservoirs and pumping plants both for irrigation and for municipal supply systems, are receiving much attention. The demand for mining machinery in Mexico shows a marked improvement now that the government of that country is apparently rapidly approaching a settled basis.

The Victor Irrigation Company has organized at Midland with a capital stock of \$125,000. It will construct a large system of irrigation and will install the necessary pumping machinery to place the water over the lands that are to be reclaimed. The incorporators are Alfred C. Owens, Jacob C. Swain and Parker B. Rodgers.

Machinery for the large pumping station, including the 20,000,000-gal. pump that is to be installed at the new White Rock reservoir for the municipal water-works plant of Dallas has arrived upon the ground. The temporary 1,000,000-gal. pump which was obtained at Joplin, Mo., has been installed at the temporary station.

J. W. Hoit, Brownsville, is promoting the construction of a large system of irrigation in the valley of the Rio Grande near Donna. It is planned to run these canals and laterals through about 50,000 acres of land, all of which is now in a wild state. The proposed pumping plant will be one of the largest in the Rio Grande Valley and will be equipped with the most modern machinery. D. R. Swift, of Lake Charles, La., is also interested in the project.

Negotiations are in progress looking to the erection of a large cotton compress at Trinity. The State Bank of Trinity is interested in the project.

Lon C. Hill, Harlingen, and associates will erect a large cottonseed oil mill at that place. The same interests also contemplate installing an ice factory of large capacity.

The city of Denison has taken steps looking to the installation of a pumping station at some point on the Red River and the laying of a water pipe line from the station to that city, where connection will be made with the waterworks distributing system. The proposed pipe line will be about four miles long. At present the city is obtaining its water supply chiefly from wells.

The recent election at Waco voting on the proposition of issuing \$200,000 of bonds for extending the sewer system, opening new streets and other municipal improvements resulted favorably to the proposition.

A reinforced concrete bridge is being constructed across the Colorado River at Stacy, Mitchell County. It will be 696 feet long. D. L. Gillis has the contract.

The Commercial Club of El Campo is making good progress in promoting the establishment of a brick plant there.

The City Council of Bryan will soon order a special election to vote on the proposition of issuing \$20,000 of bonds for making further improvements to the waterworks and electric light plants and the sewerage system.

The Orange Commercial Club of Orange is creating a fund of \$50,000, which is to be used in promoting the establishment there of new factories.

The Continental Wax Company, Little Rock, Ark., has let the contract for the installation at Sanderson, Tex., of a large factory for the manufacture of wax from the candelilla plant. There are many millions of tons of this plant growing in that section. It has heretofore been considered a worthless vegetation, and the discovery that it is valuable for its wax product is comparatively new.

S. A. Robertson, San Benito, and associates, who are constructing a system of gasoline motor interurban lines out of that place, have greatly enlarged their

plans. The first 40 miles of the new road was recently opened for passenger and freight traffic and is now in regular operation. Arrangements have been made for constructing immediately about 60 miles more of track. It will be one of the longest gasoline motor railroads in the United States, it is said. The St. Louis & San Francisco Railway Company is back of the enterprise and the particular object of the system is to serve as a feeder for the St. Louis & Brownsville Railroad, which is owned by the Frisco. Gasoline motors will be given a thorough trial, and should they not prove satisfactory they will be replaced by electric transit.

### Government Purchases

WASHINGTON, D. C., July 3, 1911.

The Paymaster General, Navy Department, Washington, D. C., will open bids July 11, under schedule 3718, for one engine lathe, one plain radial drill, one shaver, one sensitive drill, one speed lathe, one emery grinder, all to be motor driven, and one oxy-acetylene welding plant and generating outfit.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids August 1 for two rapid action punches for delivery to Mare Island, Cal., schedule 3720.

Beekman Winthrop, Acting Secretary, Navy Department, Washington, will open bids until September 1 for the construction, complete, of four submarine torpedo boats.

The Light House Inspector, Fifth District, Baltimore, Md., opened bids June 1 for furnishing compressed air fog signal machine for light vessel No. 52 as follows: Remington Oil Engine Company, Stamford, Conn., \$3631; De La Vergne Machine Company, New York, \$4200; August Mietz, New York, \$5000.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids June 22 for material and supplies for the Navy Yards as follows:

Class 11, one splitting shear—Bidder 22, Berger & Carter Company, San Francisco, Cal., \$1,835; 38, Cleveland Punch & Shear Works, Cleveland, Ohio, \$1,300; 60, Eccles & Smith, San Francisco, Cal., \$1,840; 128, Manning, Maxwell & Moore, New York, \$2,385; \$2,040 and \$4,170; 160, Henry Pels & Co., New York, \$1,840; 165, J. T. Ryerson & Son, Chicago, Ill., \$1,250; 218, Drew Machinery Agency, Manchester, N. H., \$863.

Class 32, one heavy duty gap lathe—Bidder 65, Fairbanks Company, Washington, D. C., \$892; 128, Manning, Maxwell & Moore, New York, \$900; 150, Niles-Bement-Pond Company, New York, \$1,200; 158, Prentiss Tool & Supply Company, New York, \$875.

Class 33, one heavy duty back geared engine lathe—Bidder 65, Fairbanks Company, Washington, D. C., \$654 and \$354; 69, Frevert Machinery Company, New York, \$408 and \$448; 73, Garvin Machine Company, New York, \$346; 77, Griscom-Spencer Company, New York, \$363.39; 107, J. P. Kemp, Baltimore, Md., \$329.40 and \$359.40; 128, Manning, Maxwell & Moore, New York, \$432 and \$583; 138, Miami Valley Machine Tool Company, Dayton, Ohio, \$300; 149, D. Nast Machinery Company, Philadelphia, Pa., \$359; 150, Niles-Bement-Pond Company, New York, \$385 and \$475; 158, Prentiss Tool & Supply Company, New York, \$350; 175, Springfield Machine Tool Company, Springfield, Ohio, \$463.

Class 34, one single geared crank shaper—Bidder 5, American Tool Works Company, Cincinnati, Ohio, \$236; Fairbanks Company, Washington, D. C., \$275 and \$300; 69, Frevert Machinery Company, New York, \$255; 73, Garvin Machine Company, New York, \$420; 77, Griscom-Spencer Company, New York, \$399.49; 103, A. R. Kelly Company, Xenia, Ohio, \$240; 107, J. P. Kemp, Baltimore, Md., \$217 and \$323.80; 128, Manning, Maxwell & Moore, New York, \$326 and \$348; 149, D. Nast Machine Company, Philadelphia, Pa., \$238; 150, Niles-Bement-Pond Company, New York, \$265; 153, Potter Delaney Supply Company, Philadelphia, Pa., \$295; 175, Springfield Machine Tool Company, Springfield, Ohio, \$252 and \$355.

Class 35, one universal milling machine—Bidder 18, Brown & Sharpe Mfg. Company, Providence, R. I., \$922.38; 65, Fairbanks Company, Washington, D. C., \$953 and \$1,155; 73, Garvin Machine Company, New York, \$972; 77, Griscom-Spencer Company, New York, \$879 and \$1,021.37; 107, J. P. Kemp, Baltimore, Md., \$1,005; 128, Manning, Maxwell & Moore, New York, \$920; 150, Niles-Bement-Pond Company, \$940.

Class 36, one sliding head upright drill—Bidder 65, Fairbanks Company, Washington, D. C., \$320 and \$472; 69, Frevert Machinery Company, New York, \$348; 73, Garvin Machine Company, New York, \$388.50; 77, Griscom-Spencer Company, New York, \$369; 107, J. P. Kemp, Baltimore, Md., \$298 and \$422; 128, Manning, Maxwell & Moore, New York, \$268 and \$341; 149, D. Nast Machinery Company, Philadelphia, Pa., \$295; 150, Niles-Bement-Pond Company, New York, \$310.

Class 37, one tool grinding machine—Bidder 65, Fairbanks Company, Washington, D. C., \$72; 77, Griscom-Spencer Company, New York, \$67.93; 107, J. P. Kemp, Baltimore, Md., \$60.70; 128, Manning, Maxwell & Moore, New York, \$60.50; 149, D. Nast Machinery Company, Philadelphia, Pa., \$53; 150, Niles-Bement-Pond Company, New York, \$60; 177, Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, \$91.02.

Class 38, one electric motor—Bidder 53, Diehl Mfg. Company, Elizabethport, N. J., \$438.25; 70, General Electric Company, Schenectady, N. Y., \$401; 75, Garwood Electric Company, Garwood, N. J., \$414.15; 82, Holtzer, Cabot Electric Company, Boston, Mass., \$326 and \$470; 169, Reliance Electric & Engine Company, Cleveland, Ohio, \$383; 182, B. F. Sturtevant Company, Hyde Park, Mass., \$389.

Class 61, one double bolt cutting machine—Bidder 6, Acme Machinery Company, Cleveland, Ohio, informal; 106, E. F. Kerwan, Baltimore, Md., \$780; 107, J. P. Kemp, Baltimore, Md., \$783.50; 108, Landis Machine Company, Waynesboro, Pa., \$838; 128, Manning, Maxwell & Moore, New York, \$896; 150, Niles-Bement-Pond Company, New York, \$775.

# CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Refined Iron:		Nos. 22 and 24.....		Straits Pig .....	
1 to 1 1/2 in. round and square.....		No. 26.....		No. 47 @ 17 1/2	
1 1/2 to 4 in. x 3/4 to 1 in. ....		No. 28.....		Copper—	
1 1/2 to 4 in. x 3/4 to 5-1 .....		2 1/2 in. corrugated.....		Lake Ingot .....	
R- 1/2 and 11-16 round and square.....		No. 24.....		Electrolytic .....	
Cts. @ lb.		No. 26.....		Casting .....	
3 in. x 3/4 in. and larger.....		No. 28.....		Spelter—	
3 in. x 3/4 in. x 1/2 in. ....		Tin Plates—		Western .....	
1 1/2 to 2 1/2 in. x 1/2 in. ....		American Charcoal Plates (per box)		Zinc—	
1 1/2 to 2 1/2 in. x 3/4 in. and thicker.....		"A.A.A." Charcoal:		No. 9, base, casks..	
1 to 1 1/2 in. x 3/4 in. ....		IC, 14 x 20.....		@ 8 1/2 Open..	
1 to 1 1/2 in. x 1/2 in. ....		IX, 14 x 20.....		Lead—	
3/4 x 1/2 in. ....		A. Charcoal:		American Pig.....	
3/4 in. x 1/2 in. ....		IC, 14 x 20.....		Bar .....	
3/4 x 3/32 in. ....		IX, 14 x 20.....		Soldier—	
Tees:		American Coke Plates—Bessemer—		1/2 & 3/4, guaranteed.....	
1 in. ....		IC, 14 x 20.....		No. 1 .....	
1 1/2 in. ....		IX, 14 x 20.....		Refined .....	
1 1/2 to 2 1/2 x 1/2 in. ....		American Terne Plates—		Prices of Solder indicated by private brand vary	
1 1/2 to 2 1/2 x 3/4 in. ....		IC, 20 x 28 with an 8 lb. coating.....		according to composition.	
3 in. and larger.....		IX, 20 x 28 with an 8 lb. coating.....		Antimony—	
Beams.....		Seamless Brass Tubes—		Cookson .....	
Channels, 3 in. & 4 larger.....		List November 13, 1908.		Halletts .....	
Bands—1 1/2 to 6 x 3-16 to No. 8.....		Base price, 18¢		Other Brands .....	
"Burden's Best" Iron, base price.....		Brass Tubes, Iron Pipe Sizes—		Bismuth—	
Burden's "H. B. & S." Iron, base price.....		List November 13, 1908.		Per lb .....	
Norway Bars.....		Base price, 18¢		\$2.00 @ \$2.25	
Merchant Steel from Store—		Copper Tubes—		Aluminum—	
per lb.		List November 13, 1908.		No. 1 Aluminum (guaranteed over 99% pure), in	
Bessemer Machinery.....		Base price, 18¢		Ingots for remelting.....	
Toe Calk, Tire and Sleigh Shoe.....		Brazed Brass Tubes—		Rods & Wire.....	
Best Cast Steel base price in small lots.....		List February 1, 1911.		Base Price 31¢	
Sheets from Store—		High Brass Rods—		Base Price 33¢	
Black.		List February 1, 1911.		Old Metals—	
One Pass, C.R. R. G.		Roll and Sheet Brass—		Dealers' Purchasing Prices Paid in New York.	
Soft Steel, Cleaned.		List February 1, 1911.		Copper, heavy and crucible.....	
No. 16.....		Brass Wire—		10.75 to 11.00	
Nos. 18 to 20.....		List February 1, 1911.		Copper, heavy and wire.....	
Nos. 22 and 24.....		Copper Wire—		10.50 to 10.75	
No. 26.....		Base Price,		Copper, light and bottoms.....	
No. 28.....		Carlond lots mill 13 1/4¢		9.50 to 9.75	
Russia, Planished &c.		Copper Sheets—		Brass, heavy .....	
Genuine Russia, according to assort-		Sheet Copper Hot Rolled, 16 oz. (quantity		7.25 to 7.50	
ment .....		lots) .....		Brass, light .....	
Patent Planished, W. Dewees .....		Sheet Copper Cold Rolled, 1¢ @ lb advance		5.75 to 6.00	
Wood.....		over Hot Rolled .....		Heavy machine composition.....	
Galvanized		Sheet Copper Polished 20 in. wide and		9.25 to 9.50	
Nos. 12 and 14.....		under, 1¢ @ square foot.		Clean brass turnings .....	
No. 24.....		Sheet Copper Polished over 20 in. wide, 2¢		7.00 to 7.25	
No. 26.....		@ square foot.		Composition turnings .....	
No. 28.....		Planished Copper, 1¢ @ square foot more		8.00 to 8.25	
No 20 and lighter 36 inches wide, 25¢ higher.		than Polished.		Lead, heavy .....	
				3.75	
				Lead, tea .....	
				3.50	
				Zinc, scrap .....	
				4.00	

## NICHOLSON

Granted that just ONE mechanic in your shop can save from ten to twenty minutes time per day through the use of NICHOLSON FILES—how great will be the saving when from fifty to one hundred or more men "get busy" with the fast cutting

### NICHOLSON?



**Nicholson File Company**  
Providence, R. I.



